For Men Who Manage FEBRUARY 1957

chemical processing

FOR VIPs ONLY
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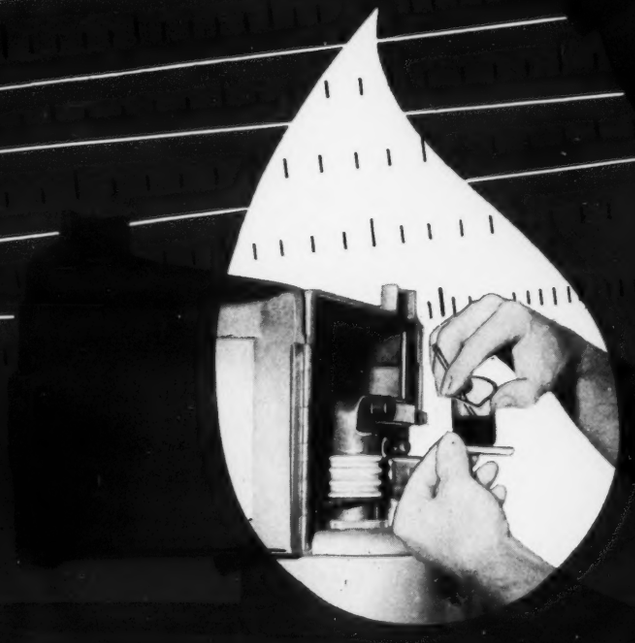

SPECTROMETRY
CUTS TECHNICAL MANPOWER NEEDS

Quicker results mean closer control of Dronite's lube oil additive processes . . . page 84

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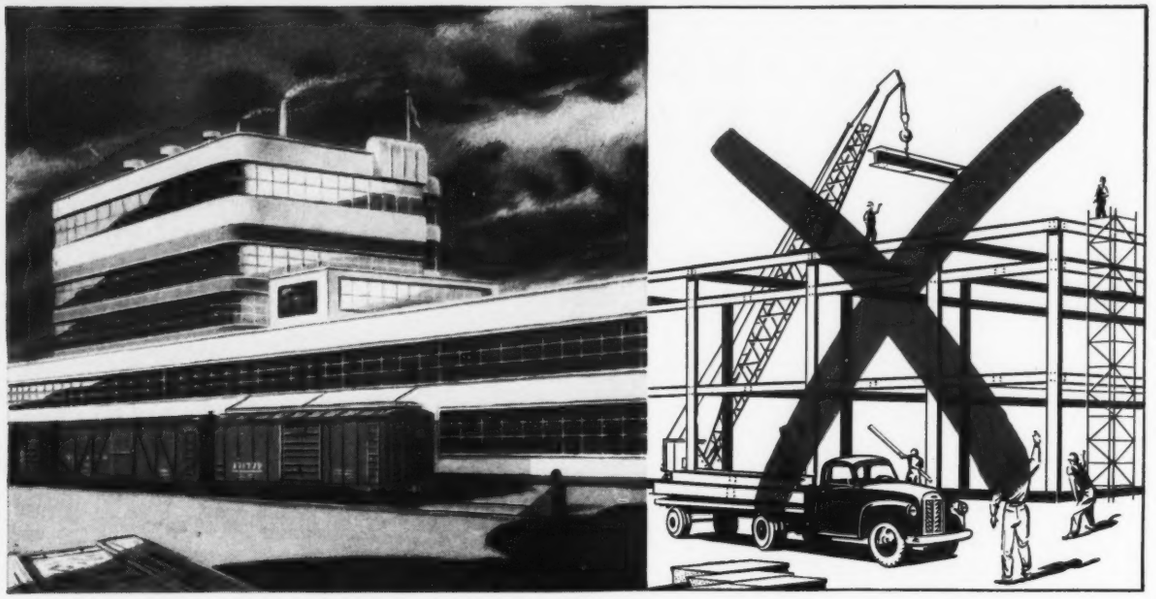
memo to chemical management . . .



How to Expand Production

without additional capital investment!

Consider these typical examples:

1. You plan to step up production of one of your present products. The manufacture involves intermediates. Your plant site is limited. *There may be no need to buy additional land or move your plant!* Here's what a number of Baker & Adamson customers have done. They have *abandoned* production of intermediates and purchased them instead from B&A. The space formerly devoted to intermediates is now used more profitably and efficiently for expanded production of their end product.

2. You plan to produce a *new* product. One or more "special" chemicals form part of the manufacturing process. In most cases, you will save time and money by buying these chemicals from B&A rather than making them yourself. Baker & Adamson is fully equipped to supply "custom-made" chemicals for such needs.

If either of these examples represents a situation you will soon have to resolve, we will be glad to explain in detail why you should call on Baker & Adamson. Here, briefly, are a few of many excellent reasons:

✓ As the country's leading producer of extremely high purity laboratory reagents and fine chemicals, B&A can be depended on to meet your every requirement for fine and special chemicals in either L/C/L or tonnage quantities.

✓ B&A's versatile, adaptable facilities now produce several hundred products . . . are well equipped to supply "custom-made" chemicals for virtually every need.

✓ B&A's 27 sales offices and coast-to-coast chain of warehouses assure you of dependable, local service.

We invite your inquiries.

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ALLIED CHEMICAL & DYE CORPORATION
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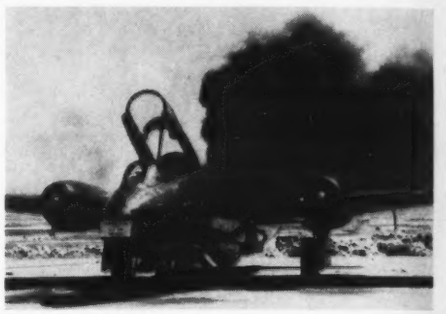
When inquiring check 1482 opposite last page

THAT'S INTERESTING



Right engine on this jet bomber is being started by a "smokeless" propellant developed by Standard Oil of Indiana. Left engine uses conventional propellant. No ground power is required and planes can operate from rudimentary air bases with less chance of detection. Units start and assist jet engines to idling speed within 25 seconds.

Jungle rhythm

West Indian natives find used oil drums a satisfactory substitute for telephones. Drums, used in the natives' jungle telegraph system, are hack-sawed to various sizes and then tuned with a sledgehammer to achieve the proper awesome tones. (Selas Corp. of America, *High Gradient*)

Have your cake and eat it too, in adhesive testing

An ultrasonic bond analyzer manufactured by Allen B. DuMont Labs will enable manufacturers to test the strength of adhesive-bonded laminates or honeycombs without destruction of unit under test.

Analyzer consists of a sweeping oscillator and a barium-titanate transducer, a cathode-ray oscillograph, and an oscillograph-record camera. Crystal transducer applies ultrasonic stresses to piece under test, and the instrument, through a method of coupling signals to and from the metal, receives back responses which appear on the oscillograph in wave form. By reading the patterns, any flaws in the laminate can be identified.

Woman power

At Sindri Hihar, India, a synthetic ammonia plant is now aiding in converting region's desert lands into rich crop producers. Plant, several years in construction, was virtually handmade by Indian women. "At one phase of construction over 3000 women were on the job", reports Randall A. Williams of Worthington Corp., suppliers of refrigeration equipment used.

(*Please turn to page* 231)

chemical processing

with which is combined
CHEMICAL PROCESSING PREVIEW
and Chemical Business

for men who manage

Vol. 20 February 1957 No. 2

CHEMICAL PROCESSING Magazine serves American industry wherever chemicals and chemical processes are involved.

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Soap & cleansing products
Paints, varnishes, lacquers
Gum & wood chemicals (Naval Stores)
Fertilizers
Animal & vegetable oils & fats
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Paper & allied products
Petroleum, coal, coke-oven products
Rubber products
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Atomic energy establishments

Other industries utilizing chemicals or chemical processes

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Leather tanning & finishing
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Plant construction, consulting firms
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Accepted as Controlled Circulation publication at Mendota, Illinois. Publication office: 1501 W. Washington Road, Mendota, Illinois. Address all correspondence to Editorial and Executive office, 111 East Delaware Place, Chicago 11, Illinois.

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Plastics, foods, chemicals and pharmaceuticals whose purity must be protected can now be conveyed in bulk swiftly —and safely—with Dracco Airstream Conveyors. Airstream's special features, unmatched in other conveyors, keep all foreign matter out of the conveyor and prevent contamination of materials from the conveyor itself.

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Dracco Uni-Filters remove all foreign matter from conveying air before it enters the conveyor. This major polyethylene plant uses an Airstream Conveyor to move pellets from process to storage.

Dracco Bulletin 529, "Airstream Conveyors", contains detailed information on equipment and uses. Shows examples. For your copy, write Dracco today.

DRACCO *airstream* conveyors
dust control equipment

When inquiring check 1483 opposite last page

Over the editor's shoulder

Nomogramaniacs

To judge from our mail, the series of nomograms in CHEMICAL PROCESSING's Engineering Data section is gratifyingly popular. And no wonder! Properly designed nomograms are real time-savers. Calculations that require *minutes* by slide rule can be handled in *seconds* by nomograph—and with no question about where to put "ol' debbil" decimal point, either!

Nomographs, of course, are made by nomogramaniacs, the first of whom was probably P.M. d'Ocagne, French mathematician who formulated the principles (based on plane geometry) about seventy years ago. Brother Pythagoras, who wielded a mean pen awhile back (about 550 BC), had plenty of geometry at his disposal and could have been a nomogramaniac in his spare time if anyone had told him that there was any money in it. And there *is* money in nomography. See page 209 for an announcement of new increased rates for nomographs accepted by CHEMICAL PROCESSING.

So far nomogramaniacs haven't a separate society of their own, but they do constitute an active group in the Division of Engineering Drawing, a part of the American Society for Engineering Education.

And many engineering schools are now offering courses in nomography. Some even are using the only text[1] on the subject that I've ever been able to understand . . . and I hope I don't get charged the regular advertising rates for *that* remark.

Davis

D. S. DAVIS
CONSULTING EDITOR

(1) DAVIS, D. S., "Nomography and Empirical Equations," Ch 10, Reinhold Publishing Corp., New York, (1955)

- For more information on articles and advertisements in this issue, check the Reader Service slip opp. last page
- The product directory, pages 221 to 224, is your guide to all articles and advertisements
- To subscribe to this magazine, see reader-qualification form opp. last page

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THIS MONTH'S COVER

CP Staff photograph on this month's cover shows a liquid sample being introduced into an emission spectrometer at Oronite Chemical Company, where instrument is used to analyze lube-oil additives during their manufacture.

Before laboratory acquired instrument, five chemists did this analysis work. With increased production, more than a dozen would be needed now, and even then, the plant would not have the present high degree of quality control. Look for the story on page 84.

February 5-7. Twelfth SPI Reinforced Plastics Division Conference, The Society of the Plastics Industry, Inc., Edgewater Beach Hotel, Chicago.

February 25-*March* 1. Thirteenth International Heating & Air Conditioning Exposition, International Amphitheatre, Chicago.

February 26-28. The 1957 Western Joint Computer Conference, Statler Hotel, Los Angeles.

March 3-6. American Institute of Chemical Engineers, meeting, Greenbrier Hotel, White Sulphur Springs, West Virginia.

March 4-8. Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Penn-Sheraton Hotel, Pittsburgh.

March 11-15. Atomic Exposition and Nuclear Congress, Convention Hall, Philadelphia.

March 11-15. National Association of Corrosion Engineers, Thirteenth Annual Conference and Exhibition, Kiel Auditorium, St. Louis.

March 12-13. Chemical Market Research Association, conference, Sheraton Hotel, Philadelphia.

March 14-15. National Industrial Conference Board, fifth conference on atomic energy, Benjamin Franklin Hotel, Convention Hall, Philadelphia.

March 18-21. Society of the Plastics Industry Annual National Conference and Pacific Coast Plastics Exposition, Hotel Biltmore and Shrine Exposition Hall, Los Angeles.

March 25-29. Tenth Western Metal Congress and Exposition, Pan-Pacific Auditorium, Los Angeles.

March 27-28. Commercial Chemical Development Association, plastics meeting, Statler Hotel, New York.

March 27-29. Nineteenth Annual American Power Conference, Hotel Sherman, Chicago.

April 7-12. American Chemical Society, national meeting, Miami, Florida.

April 8-12. American Welding Society, Annual National Spring Meeting, Hotel Sheraton, Philadelphia.

April 9-11. Fifth Welding Show, Convention Hall, Philadelphia.

April 16-18. Symposium on Non-Destructive Tests of Nuclear Energy, sponsored jointly by American Society for Testing Materials, American Institute of Chemical Engineers, American Nuclear Society, and Society for Non-Destructive Testing, Morrison Hotel, Chicago.

April 24-25. National Industrial Research Conference, Conrad Hilton Hotel, Chicago.

April 29-*May* 3. Seventh National Materials Handling Exposition, Convention Hall, Philadelphia.

May 8-11. Fluid Controls Institute, meeting, Greenbrier Hotel, White Sulphur Springs, West Virginia.

Baker Trucks at Humko do double duty!

The Humko Company saves time and cuts costs with a fleet of 5 Baker Fork Trucks. Equipped with truck-loader mast and extra lift attachment, these trucks lift loads 148 inches—high enough for Humko's highest warehouse stacking jobs—from a 68-inch nested mast height—low enough to load highway trucks and boxcars.

Thus Humko takes full advantage of the flexibility of Baker Trucks—using the same trucks for double duty—saving the expense of additional equipment and saving the time of transferring loads from one machine to another . . . Let us show you how you can make similar savings in your plant or warehouse.

The Baker line includes gas, electric and gas-electric powered fork trucks. Capacities range from 2,000 to 10,000 pounds.

Baker industrial trucks

THE BAKER-RAULANG COMPANY
1208 WEST 80th STREET • CLEVELAND 2, OHIO
A Subsidiary of Otis Elevator Company

Otis

When inquiring check 1484 opposite last page

97% of MIXING PROBLEMS can be solved QUICKLY!

with 44 pg. HANDBOOK OF FLUID MIXING

Basic guide to the techniques of mixing. Non-technical in expression, it thoroughly explains the many factors that govern the power, size and type of either propeller or turbine mixers and how they apply to process requirements. Also includes easy to use tables, charts and nomographs to help solve every-day problems. *Free on request—ask for Fluid Mixing Handbook.*

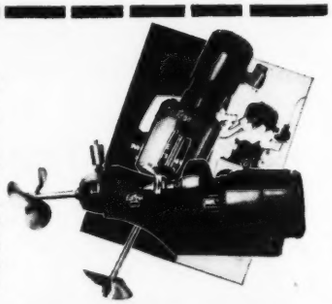
PORTABLE MIXERS

Series H at 1725 R.P.M., Series S at 1125 R.P.M., and Series G at 420 R.P.M. are available in motor ratings from 1/20 to 5 H.P. Also available are special speeds, variable speeds, as well as air driven models. *Request Bulletin 520.*

TOP AND SIDE ENTERING

Series A, extra heavy duty for large tanks, are available in side entering units only within a range of 5-30 H.P. with standard speeds of 280, 420, and 1150 R.P.M.

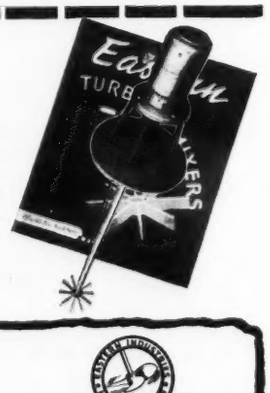
Series C, for average tank capacities, are available in sizes of ¼ to 10 H.P. at these standard speeds: 1725 R.P.M. (up to 5 H.P.); 1140 R.P.M. (up to 10 H.P.); 420 R.P.M. (up to 7-½ H.P.); 280 R.P.M. (up to 5 H.P.). Available in both horizontal and vertical models. *Request bulletin 620.*



TURBINE MIXERS

Eastern's Top and Bottom Entering Turbine Mixers are particularly applicable where liquid blending requires gentle, yet thorough agitation.

Models are available in sizes from ¼ to 40 H.P. Standard speeds are 56, 68, 84, 100, 125, 155 R.P.M. *Request bulletin 1200.*



Eastern INDUSTRIES, INC.

DEPT. F — MIXER DIVISION Regent St., Norwalk, Conn.

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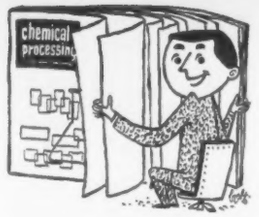


looking ahead to next month . . .

Dr. Howard Kremers and CP's Ted Meinhold look over Lindsay's, rare earth plant

Pure rare earths by ion exchange

The rare earths — samarium, europium, gadolinium, terbium, dysprosium, erbium, thulium, ytterbium, yttrium, lutetium, and holmium — are not only difficult to pronounce, they are pretty difficult to separate, too. This, of course, is because of the similarity in their molecular structures.

Lindsay Chemical Company is separating these "rare" rare earths in commercial quantities by ion exchange techniques . . . and in purities (up to 99.9%) previously almost impossible to obtain.

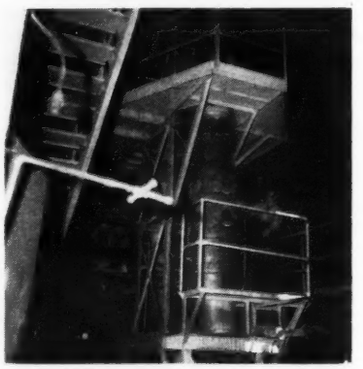
Associate Editor Ted Meinhold visited Lindsay's West Chicago, Ill., operation, talked to Dr. Howard E. Kremers, Technical Assistant to the President. You'll find the complete description of Lindsay's operation in March's New Solutions section.

Problem goes into solution

Water-based coatings offer advantages in a number of areas — reduced toxicity and fire hazards, among others — but use on metals has been something of a problem: 1) How to get good adhesion and 2) how to avoid rusting on ferrous surfaces.

Now Dow's experimental latex X-2566 coating is taking *advantage* of the iron in the metal surface. Under heat (250-350°F) and low pH conditions, the iron goes into solution, with the ions acting as a catalyst, causing double-bond cross-linking . . . in essence partially converting the thermoplastic resin to a thermosetting coating. For non-ferrous surfaces, cobalt or manganese is added to the paint as a catalyst.

CP's Editor, John Vaaler, visited M. C. Carpenter, Head of the Coatings Technical Service's Paint Section to talk about the future of water-based metallic paint. You'll find the results of the visit in March's Chemical Materials section.



Space-saving drying unit at Aluminum Company of Canada's Arvida plant

Make the process fit the space

Limited space often makes process improvement difficult. The first thought, of course, is to design efficient yet compact equipment . . . generally easier said than done.

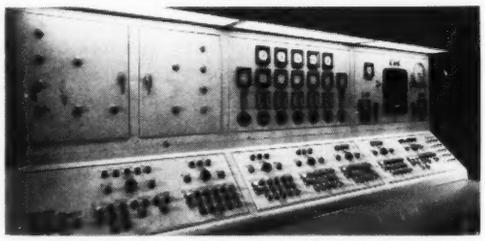
And this was the problem at Aluminum Company of Canada, Limited's Arvida, Canada, works. Dust and other foreign particles in chlorine gas were causing processing troubles. Removing the particles was simple . . . they put in a compact impingement baffle-tray water scrubber. This cleaned the gas, all right, but created another problem . . . drying the chlorine.

Here's a quick preview of features you'll find in March CHEMICAL PROCESSING

Drying the gas in conventional manner would require an excessively large amount of space — which just wasn't available.

Company solved the problem by installing a compact single-column sulfuric acid-type absorber. Unit is built of chemical stoneware sections and measures only 18″ in diameter and 13′ high. The unit handles 450 cfm gas from saturation at 90°F, without the use of separate pre-cooling equipment.

In next month's Processing Equipment section, Associate Editor Ted Meinhold and H. G. Burbidge, Gas Scrubbing Engineer at Aluminum Company of Canada, tell about the success in solving a knotty problem.



Control panel at Schwill's "ranch style" malt house

Ranch styles and malt houses

Conversion of barley into malt is traditionally a gravity-feed operation. Barley is fed into steeping tanks and then moves downward into growing and kilning rooms.

Albert Schwill and Company has a newly-patented "ranch style" malt house — all on one floor — that increases productive capacity substantially without any increase in size. In fact, the new plant is smaller than comparable and traditional plants.

Entire plant is controlled electronically with such unusual improvements as "moving floors", aluminum-tiled walls in four colors, and facilities for complete pasteurization of germinating rooms after each use.

Tom Nelligan, designer of the plant and Vice President of Schwill, guided Bill Clarke, Assistant Editor, through the facilities, explaining the "why's" and "how's" of electronic controls used. See next month's Instrumentation & Control feature.

SURE CURE for many a filtration headache — this BIRD

"My feed slurry will vary in volume."

If over-fed, the Bird will not be in trouble. Under-feeding is never a headache — actually improves moisture and clarity.

"My feed slurry has to be separated rapidly."

The Bird Continuous Centrifugal Filter requires no pre-thickening and no storage. Separation is effected in seconds.

"My feed slurry varies in size consist and solids content."

The separating efficiency of the Bird is not upset by reasonable variations in solids content or particle size. Smooth and safe operation under all conditions.

"My feed slurry must be separated at high temperature."

Hot slurries hold no terrors for the Bird. No vacuum loss from flashing, no blinding from crystallizing out in the filter media; no back wash or media conditioning required.

"I've got a maintenance headache."

Birds have no filter cloths to maintain, no vacuum apparatus, no complicated controls. Operation is clean, simple, automatic, and economical.

The range of successful profitable application of the Bird Continuous Centrifugal Filter is so great that you ought not to put up with a filtration headache.
The Bird Research and Development Center is set up to help you find out, via pilot scale tests, how to cure these and other filtration headaches. Why not give it a try?

When inquiring check 1486 opposite last page

SAN ANTONIO, TEXAS

- **CHLORATES**
  Sodium and Potassium
- **PERCHLORATES**
  Ammonium and Potassium
- **MANGANESE DIOXIDE**
  Electrolytic Grade

Another plant, another picture, another step in Trona's continuing expansion program in the Chemical Industry. American Potash takes its place among leading producers in the electrochemicals field with ammonium and potassium perchlorate for aviation and guided missiles; sodium chlorate for pulp (kraft) bleaches, weed killers and defoliants; potassium chlorate for matches, flares and fireworks; and manganese dioxide for military communications and hearing aids. The new Henderson operation, as a partner-in-progress with the new lithium hydroxide plant of American Lithium Chemicals, Incorporated, San Antonio, Tex., gives added impact to Trona's diversification program in chemicals vital to Industry and Agriculture.

*TRADEMARK AP&CC

American Potash & Chemical Corporation

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ALSO PRODUCERS OF | BORAX • POTASH • SODA ASH • SALT CAKE • LITHIUM • BROMINE and a diversified line of specialized agricultural and refrigerant chemicals.

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A native of Philadelphia, Dr. Hill took both undergraduate and graduate work at the University of Pennsylvania. He received a Bachelor of Science degree in Chemistry in 1913 and a PhD in chemistry three years later.

His first post-graduate employment was with the Barrett Company, beginning as research chemist in 1916. He later became laboratory manager.

Dr. Hill joined Sun Oil Company at its Marcus Hook refinery in 1934 as manager of the newly-formed Development Division. In January, 1948, he was appointed director of Chemical and Engineering Division, Research and Development Department, and became department director in 1952. He served in that capacity until retirement in 1956.

Active in the American Petroleum Institute's research program for many years, Dr. Hill was chairman from 1928 to 1949 of the Advisory Committee for A. P. I. Research Project No. 6. From 1931 to 1945 he served as chairman of the Advisory Committee on Fundamental Research on the Composition and Properties of Petroleum. The A. P. I. presented him with its "Certificate of Appreciation" in 1950 as an acknowledgment of meritorious service to the petroleum industry through his work for the Institute.

FOR MEN WHO MANAGE
chemical processing
FEBRUARY 1957

TECHNICAL WRITING IN INDUSTRY

DR. J. BENNETT HILL
Director of Research and Development (retired)
Sun Oil Company

Industry employs scientists and engineers to use their professional knowledge and skills to work out ways by which their company can extend its profitable operations. Now it is quite obvious that no matter how well the technical man does his job and how successful he is in solving his problem, his company doesn't profit by it unless he can effectively communicate to others in the company what he has found out and what he recommends that they do about it. If the Ivory Tower is sealed so that nothing can get out, the man might just as well not be there. We have the same situation as in the case of the phonograph playing beautiful music in the desert with no one to hear it. Nobody profits! The man who did the work serves no useful purpose and he might just as well not be there.

All of us are educated to present our ideas in writing. But the effectiveness with which we have learned to present our ideas varies from person to person. It is not enough that we get down on paper in the written word the knowledge we have gained. Unless somebody reads it we are again like the phonograph playing in the desert. *Therefore, it is our obligation as writers to be sure that someone, and the right person at that, reads what we have written.* We can't compel him to read it, our only recourse is persuasion and our persuasive instrument is the character and the power of our written presentation.

I make it a point to try to impress these facts on our new technical men, but some of them don't seem to understand or believe. Unless they get it, they are committing professional suicide. It is very gratifying, however, that in the last twenty years the colleges and universities have been starting to stress this subject to their undergraduates and have been making more of an effort to show them how to write. The importance is being better recognized and the benefits should follow.

The Reader's Viewpoint

My particular interest here is to discuss technical writing with you, not from the standpoint of the writer nor of the critic but from that of the reader. As a result of all the reports which I have read, both good and bad, I have accumulated a lot of respect for good technical writing. Some of my colleagues might even tell you that I am a little hipped on the subject.

Maybe before we get on with this discussion it would be well for us to form, and keep, a mental picture of the so-called "busy executive" from whose point of view we are trying to consider this matter. Incidentally, I always rather resent the term "busy executive" since it implies that he loafs less than the specialists. But in one sense, he *is* busier. His work is more diverse. His time is not his own; if he gets a half hour to concentrate on something without interruption, he is lucky.

Supposedly, he has trained himself to shift quickly from one subject to another, but there is some slight jar in even the best automatic gear shifts. Maybe he is familiar with the highly specialized lingo of his technical men and maybe he isn't. Like every other busy person he hasn't time to read everything that comes across his desk. The responsibility for the final decision falls on him a little more heavily than it does on the engineer who makes the recommendation. Let us keep him in mind.

Much of our technical writing is purely for information. Some of it is to sell something. In either case if it is to be read, thereby accomplishing its *sole* purpose, it must be interesting and it must be brief. I cannot emphasize these two points too strongly.

You have all had this experience: You are tired, you pick up a piece of technical writing that you want to, or think you ought to, read, and you find it deadly dull. Or you have to refer back from page seven to a figure on page two to find out what the author is talking about. Pretty soon you get the reaction "Why do I have to read this thing? Maybe I don't!" and the old procrastination gets to working and you put it down — never to take it up again. But you have also had the contrary experience of picking something up to see what it was about and not being able to put it down until you have read every word. You as writers want your stuff read. Make it interesting!

But even if it is interesting it may be too long. Your prospective reader may not have the hour it would take to read it. Sure, he can take it home in his brief case, but, after all, brief cases hold just so much.

(*Please turn to page* 219)

Story Behind the Story

During 1948 Atlantic Refining began large-scale manufacture of alkyl aryl sulfonate synthetic detergents, trade-marked Ultrawet, at its Point Breeze plant in Philadelphia, using polymer oil from its Refining Department.

Operations at the Ultrawet plant consist of three main steps: alkylation, sulfonation, and concentration. Alkylation process, in which pump described in adjoining article plays a part, consists of reacting a polymer oil and benzol in presence of a catalyst.

Initially the catalyst was fed to the reactor in form of a dry powder. Because of waste, Atlantic engineers decided to feed the catalyst as a suspension in the polymer oil. Then trouble started. The corrosive, gritty slurry couldn't be handled by ordinary pumps without extensive constant maintenance.

Article here reports how they solved this problem.

Here at Point Breeze, The Atlantic Refining Company produces its Ultrawet-synthetic detergent of the very highest quality — for shipment to formulators both in this country and abroad. White building in center background (arrow) houses control room and reactors where polymer oil and benzol are mixed with catalyst slurry fed by seal-less pump

The Atlantic Refining Company switches to a seal-less centrifugal pump for handling a corrosive, abrasive slurry . . .

slashes costs 80% on pump maintenance

WILLIAM C. CLARKE, Assistant Editor
with **LESLIE R. HENRY,** Maintenance Engineer
Chemicals Department
The Atlantic Refining Company
Philadelphia, Pa.

Problem: Every thirty days, a stainless steel centrifugal pump at Atlantic Refining's Philadelphia plant had to be torn down and rebuilt while another went into operation. Pump was used to handle a highly corrosive slurry which hardened on contact with air to make an abrasive, gritty mass of cutting particles. Each pump was equipped with a stuffing box and flush streams to the lantern ring and point where shaft enters the gland. Despite flushing, service from the units was not good. Corrosive gritty particles were causing abrasion and failure of the packing, with consequent

(*Please turn to page* 20)

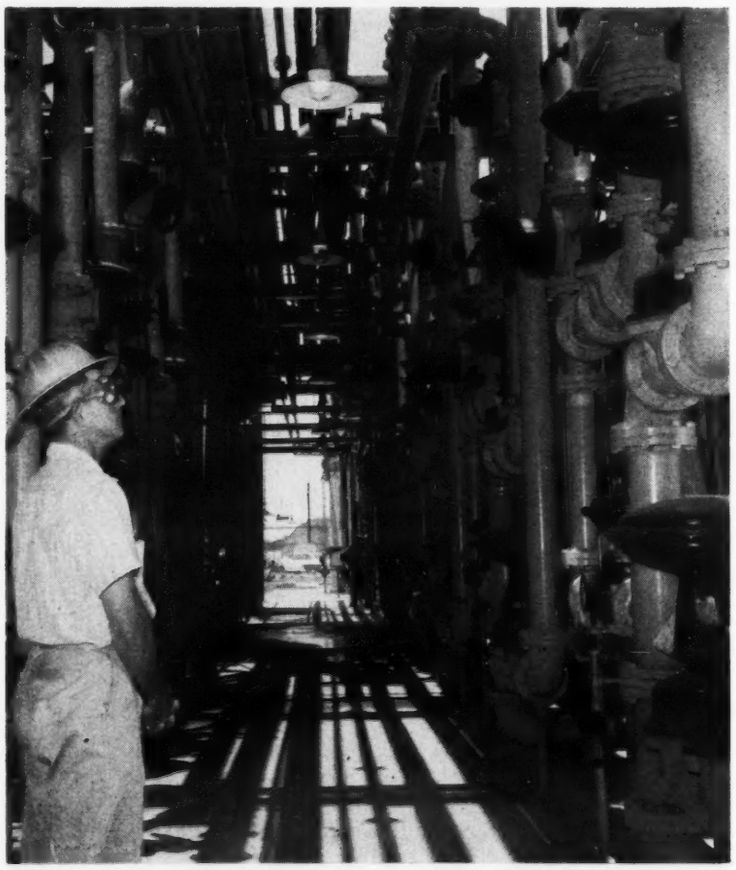
◀ Neutralization of product of alkylation and sulfonation steps is done in these glass-lined tanks

At rate of 36,000 gph, water from Brazos River containing 1440 ppm dissolved solids is purified. Deposits are eliminated on turbines, boiler blowdown is decreased, while corrosion is expected to decrease with high-purity water furnished by —

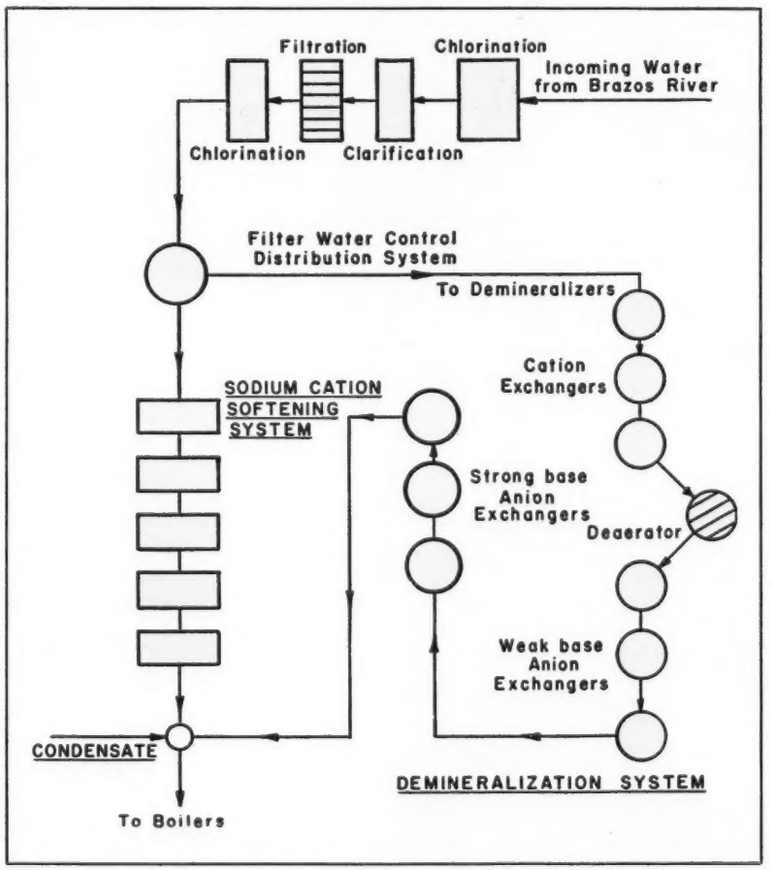
MONSANTO'S COMPLETELY A
DEMINERALIZATION S

GORDON WEYERMULLER
Associate Editor

F. H. Rankin, Power Plant Supervisor (foreground) looks over the more than 100 control valves used in demineralization system



Water purification system at Monsanto



new solutions
of processing problems

AUTOMATIC SYSTEM

Problem: Condensate recovery at the Monsanto Texas City plant was insufficient to maintain the required low dissolved-solids content of water used for operation of high-pressure steam boilers. Treating system was designed for 700 ppm max dissolved solids in the incoming water, which is obtained from the Brazos River. With the drought, the dissolved solids went as high as 1200-1500 ppm, too high to be satisfactorily handled by the treating system in use.

This caused deposits on turbines, reducing maximum attainable speeds, and limiting boiler capacity because of need for high blowdown. Presence of CO_2 in steam was also a cause of corrosion.

Solution: In December 1955, Monsanto placed in service a completely automatic, multiple-bed demineralization system large enough to meet the needs of the plant, even when the dissolved solids content of the water is running high.

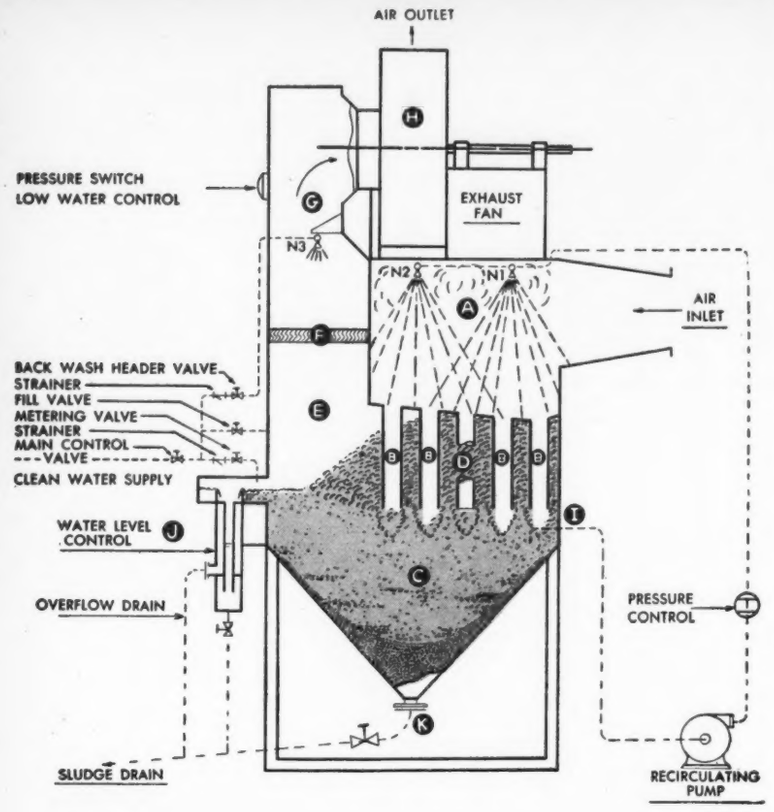
Demineralization system consists basically of a battery of three cation units, three weak-base anion units, and three strong-base anion units. It also has a vacuum deaerator in system. Water coming from Brazos River is chlorinated prior to clarification. It is then filtered through a bed of anthracite and chlorinated again before it passes to demineralization plant. After that, water goes in turn to cation units, deaerator, weak-base anion units, and strong-base anion units.

Vacuum deaerator, used to remove CO_2 and O_2,

(*Please turn to page* 17)

Vacuum deaerator in center of demineralization system is mounted on a 130' high tower to take advantage of available head

Photos by CP Staff



Drawing shows basic components of scrubber for removing microscopic solids, fumes, and odors from exhaust gases

Fumes, dust, and odors from processing plants can cause headaches in more ways than one. Community relations, employe morale, and safety are generally involved. US Rubber Reclaiming Company found the cure by installing efficient water-type scrubbers that . . .

STOP FUMES — AND

TED F. MEINHOLD, Associate Editor
with **WILLIAM A. BIRD,** Plant Engineer
US Rubber Reclaiming Co., Inc., Cheektowaga, N. Y.

Problem: Fumes and sub-micron dust from rubber hydrocarbons and reclaiming oils used in the reclamation of rubber from old tires were a constant cause of concern to US Rubber Reclaiming Co., Inc., Cheektowaga, N. Y. Oils escaping with the fumes would settle on nearby lawns and homes, leaving an unpleasant, lingering smell. Odors, at times, would blanket an area extending two to three miles from plant.

Plant reclaims 120,000 pounds of rubber per day — exhausting fume and

BEFORE ▶
Fumes escaped in thick clouds from rubber reclaiming plant. Odors at times would blanket an area extending two to three miles from plant

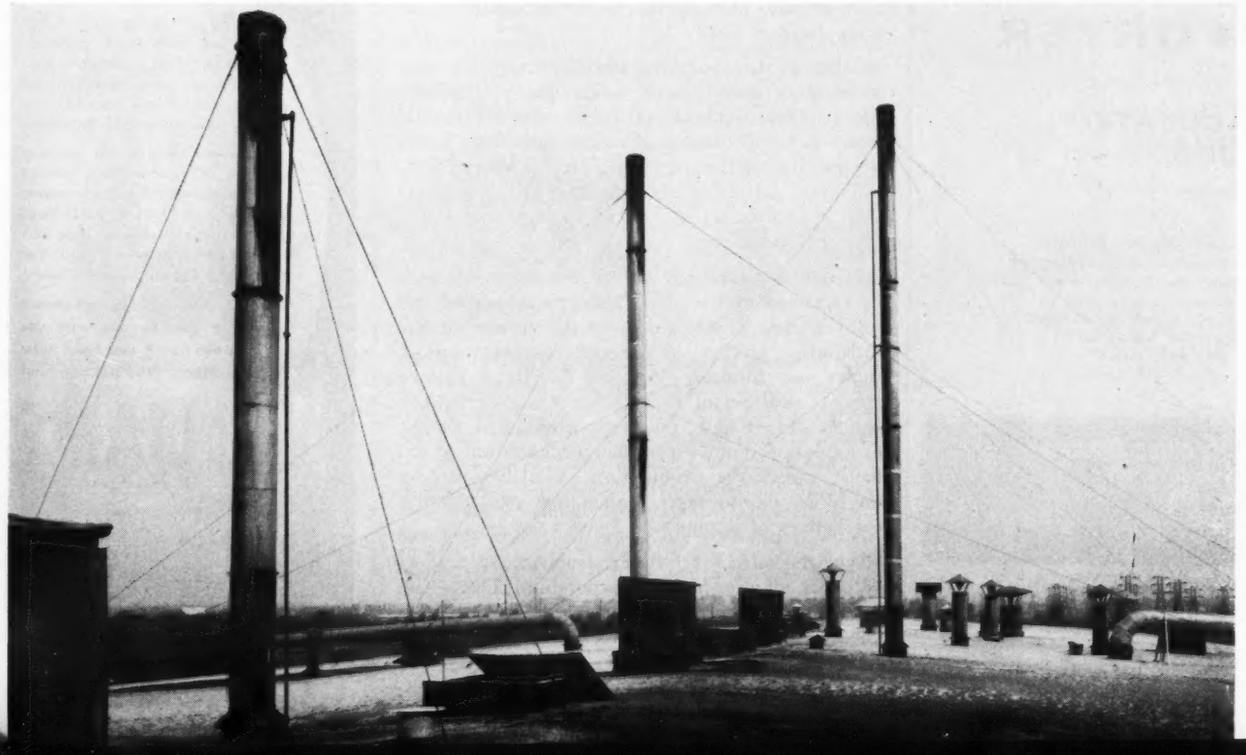
REMOVE SUB-MICRON DUST FROM EXHAUST GASES

dust-laden gas at rate of 3600 cfm, 24 hours a day. Gases inside the plant fogged the atmosphere and obscured employes' vision. Irregular spurting of the gases from the rubber reclaiming machine also caused an explosion hazard because it concentrated the fume particles, making the gases still more combustible.

Solution: After three months of testing with a pilot unit, company installed three 3000-cfm Type-A Hydro Precipitator scrubbers (see CHEMICAL PROCESSING, March 1956, pages 144-145) to solve the problem. Units are designed particularly for removing microscopic solids, fumes, and odors from exhaust gases. Each is a self-contained machine, consisting essentially of: 1) plenum chamber, 2) multiple-tube section, 3) water reservoir, 4) dewatering filter, and 5) exhaust fan.

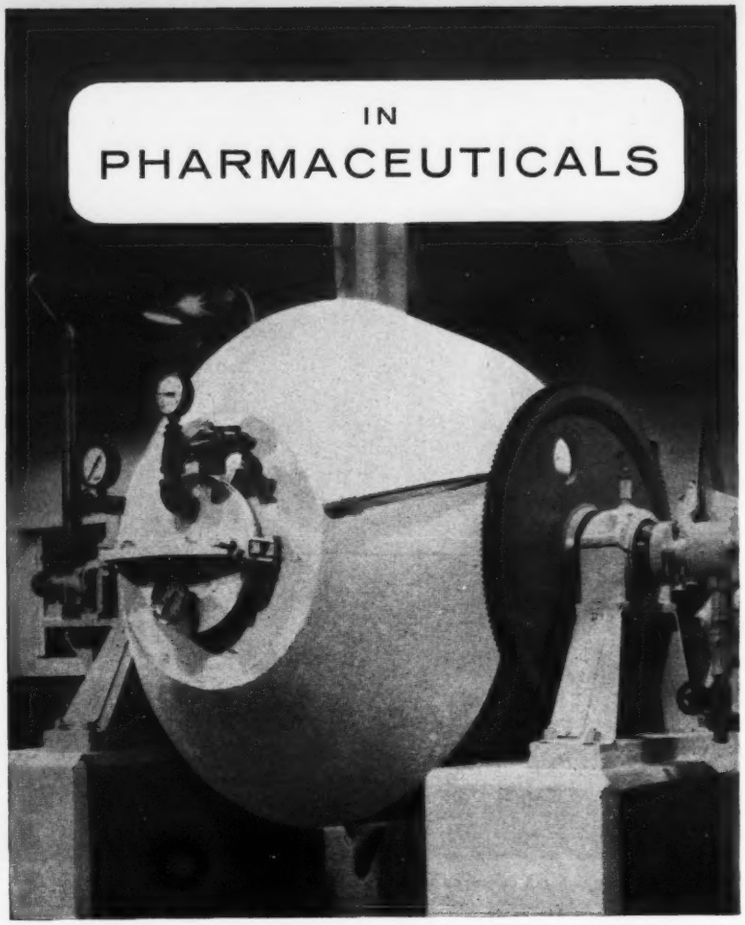
(Please turn to next page)

Each scrubber is a self-contained unit, capable of handling gases at rate of 3000 cfm



AFTER

Gravity stacks, staggered in height, show no evidence of fumes or smoke now that scrubbers have been installed



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When inquiring check 1488 opposite last page

Sub-micron Dust Removal

(*Continued from preceding page*)

Operating cycle begins with the entry of the dust-laden gas into the plenum chamber (A) as shown in accompanying drawing. Entrained solids are immediately wetted by sprays of water coming from nozzles (N_1 and N_2) located at top of chamber. Gas moves downward, compressing as it passes through precipitator tubes (B), which extend below water surface in reservoir (C). Gas entering reservoir at high velocity creates violent turbulence in the water. Solids are thoroughly wetted and trapped. Larger particles agglomerate and settle to bottom, while smaller ones are exhausted with gas. The vigorous scrubbing action rises above the normal water level of the reservoir into compartment (D), the tube chamber, where separation of gas and water takes place. Action continues into compartment (E).

Velocities are reduced in this chamber to permit final separation of air and water by gravity. Water returns to reservoir and gas rises, passing through filters (F) which remove remaining moisture. Cleaned air passes through chamber (G) and is exhausted by 7½-hp fan (H) into atmosphere.

Water in the reservoir is recirculated by 5-hp pump. Every other day, the plant changes water in scrubbers — a total of 450 gal for all three units. Amount of water used depends upon temperature of inlet gas which in this case is 125°F. Water level is maintained automatically by an overflow weir in water level control (J). Temperature of outlet gases is 105°F. Due to the sub-micron size of the dust particles, there is very little heavy sludge. However, the company drains it out each time it changes water. Unit is shut off and the filters back-washed by spray headers (N3).

Results: In operation since Spring 1956, the three units operate with better than 99% efficiency in the removal of fumes, and 98% efficiency in the abatement of microscopic dust. Particles handled in the inlet gases are 0.8 micron size, and those exhausted are estimated as 0.2 micron. Dust concentration is reduced from one to 0.015 grain per cubic foot.

Oil is totally scrubbed out of the exhausted gas. In fact, use of the units now permits plant to recover some of the oil for reuse in the rubber reclaiming process. While the concentration of fumes was formerly 45 ppm, (in the explosive range), addition of the scrubbers has minimized danger of fire and completely eliminated danger of explosion. Fumes in outlet concentration of exhaust gases have produced no available reading on MSM Explosimeter. Labor cost of operating the battery of scrubbers is $6.00 a day.

(Type-A Hydro Precipitator scrubbers are product of The Johnson-March Corporation, Dept. CP, 1724 Chestnut Street, Philadelphia 3, Pa. . . . or check 1489 opposite last page.)

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By proper selection of Pure Red Iron Oxide pigments and extenders, pigment-volume ratio can be increased, fading and color losses retarded, and general durability improved.

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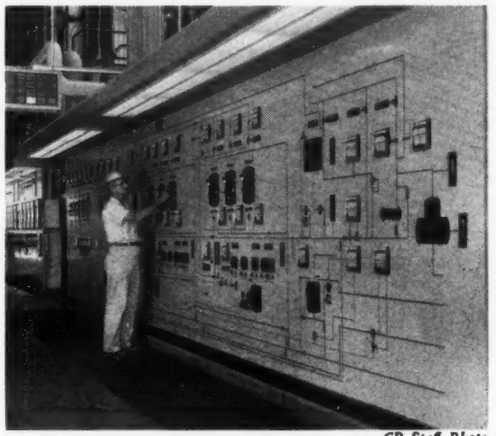
When inquiring check 1491 opposite last page

Demineralization System

(*Continued from page* 13)

consists of a 13′ diameter sphere mounted on a 130′ high tower to take advantage of available head from filtered water distribution system. This head is furnished by four centrifugal filtered water pumps. The deaerator tower provides gravity flow of deaerated cation effluent to weak-base anion units and through the rest of the system. Need for corrosion-resistant booster pumps to handle cation effluent is eliminated.

As water is sprayed over cypress slats in deaerator, CO_2 and O_2 are removed. Removal of CO_2 lessens the load and prolongs service run of strong-base anion exchangers. Removal of O_2 in cation effluent



CP Staff Photo
Control panel continuously indicates flow pattern in any portion of demineralization system

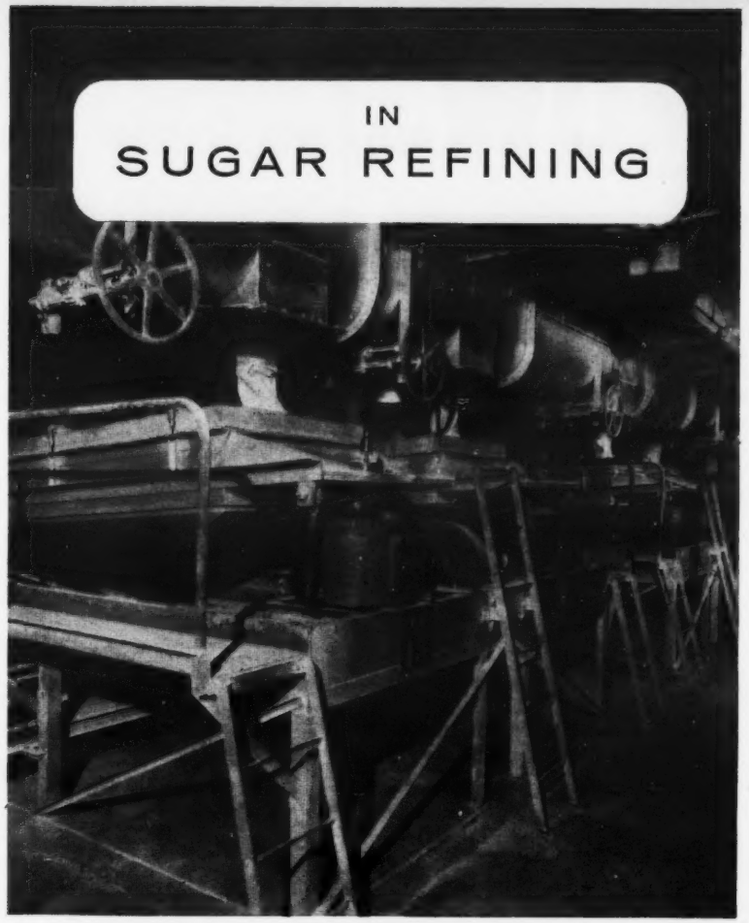
reduces possibility of anion resin deterioration by oxidation. Deaerated anion effluent is not corrosive so conventional carbon steel piping can be used from this point on, at considerable saving in cost.

Five existing semi-automatic sodium cation softening exchangers were redesigned for fully automatic operation, and are considered as part of the water purification system. They furnish all the water necessary for backwashing the weak- and strong-base anion exchangers. They are also used to provide soft water for other purposes.

Cation exchangers of the demineralization plant are regenerated with HCl, available at Monsanto. It is common practice elsewhere to use H_2SO_4 for this step. Part of the spent regenerant acid is used for succeeding regeneration of cation exchangers. A portion of spent alkali regenerant from strong-base anion exchangers is used to regenerate weak-base anion units. All waste streams are neutralized.

Ion exchange resin used in part of cation units is IR-120, a strongly acidic polystyrene bead-type sulfonic resin. Material, which is of high capacity,

(*Please turn to next page*)



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Playing an important part in the complicated process of sugar refining, these GyroCentric Screens, in the plant of a large sugar company in Canada, make clean, accurate separations. The unique gyro-centric action removes any lumps from the granulated product, and assures high screening rates for the various grades. Let us consider your separation problems. Write for catalog No. 507.

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When inquiring check 1492 opposite last page

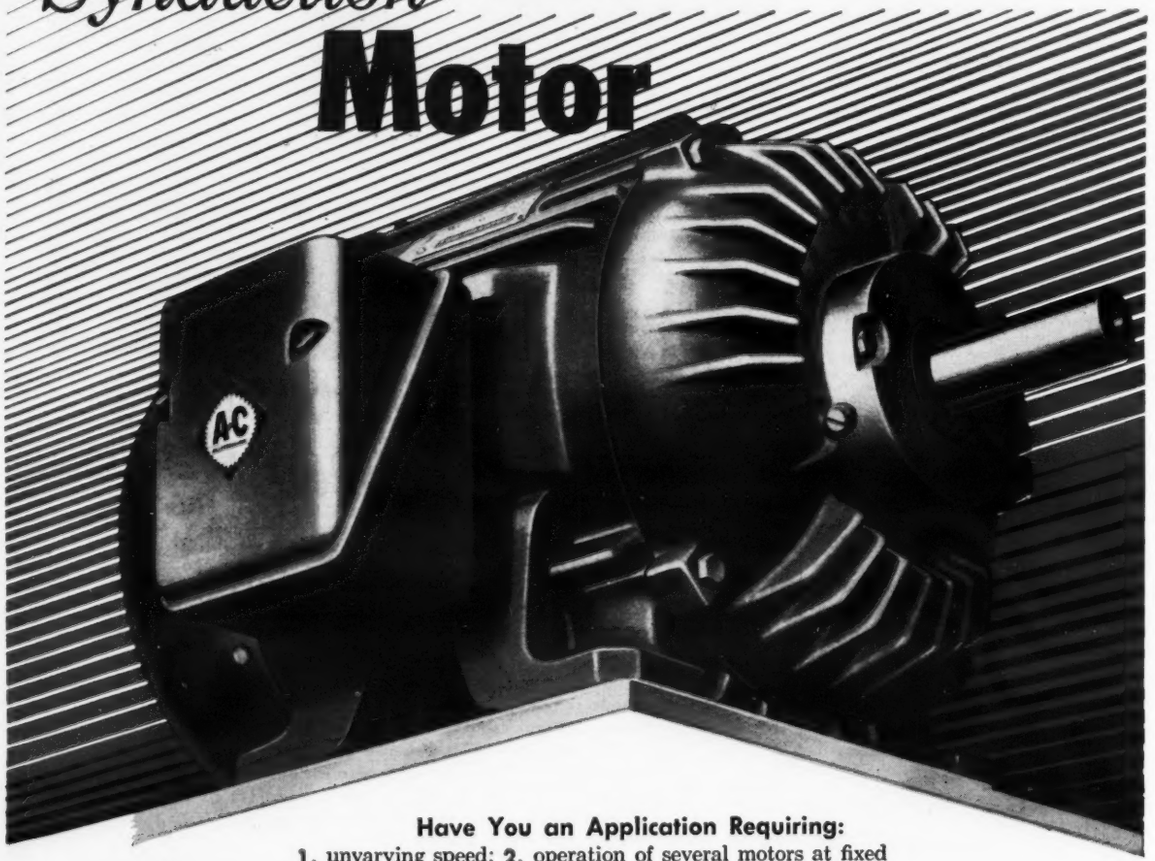
NOW dependable constant speed at less cost

Here's a motor with all the constant speed benefits of synchronous design at initial low cost — with the dependability of an induction motor. It's the NEW *SYNDUCTION* motor, built specially for applications from ¼ to 40 hp.

DEPENDABLE — Now constant speed, regardless of load or voltage changes, is sure . . . depends only on frequency. *Synduction* motor's simple die-cast rotor has no brushes, collector rings, nor insulated rotor windings.

LOW COST—Simple across-the-line control is all that's needed. Further, design permits use of frames smaller than usual reluctance-type motors. Purchase price is well below that of ordinary reluctance-type motors.

New *Synduction* Motor



Have You an Application Requiring:

1. unvarying speed; 2. operation of several motors at fixed speed ratios; 3. adjustable speed with minimum variation at any speed setting? If so, Allis-Chalmers invites your inquiry. Contact your nearby A-C office, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin, for Bulletin 51B8440.

Synduction is an Allis-Chalmers trademark.

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When inquiring check 1493 opposite last page

Demineralization System

(*Continued from preceding page*)

resists attrition and chemical attack. Remainder of cation units use C-20 or C-25 resins. These are also polystyrene-base materials, the C-20 being of high capacity and the C-25 being an opaque, porous, intermediate capacity cation resin having sulfonic acid exchange centers and a styrene matrix. Each cation exchanger contains about 400 cu ft of resin.

Resin IR-45 is used in some of the weak-base anion exchangers. It is a polystyrene-divinylbenzene copolymer in bead form with weakly basic exchange activity. Material, which is supplied in hydroxyl form, has high regeneration efficiency, high thermal stability, and resistance to oxidation. Remainder of weak-base anion units use bead-form A-30, an alkylene bridge cross-linking of polyalkylene amines to give an anion exchanger of intermediate basicity and high thermal stability. It is resistant to mild oxidizing conditions and exhibits good capacity for weak organic acids. Each of weak-base anion exchanger units contains about 333 cu ft of resin.

Strong-base anion exchangers use IRA-400 resin, a strongly basic polystyrene quaternary amine type in bead form. Material, which has the ability to absorb silica, is furnished as the chloride. Each strong base anion exchanger contains about 200 cu ft of resin.

Instrumentation

In order to provide completely automatic control, demineralizer uses more than 100 Saunders body diaphragm valves and other similar devices, controlled by instruments from a central panelboard. Diaphragm valve sequence control is electrical; air is used for motive power. Among instruments and control devices used are recorders, recorder-controllers, indicator-controllers, check valves, rotameters, conductivity and pH cells.

Control panel shows at a glance the flow pattern in any portion of demineralization plant by means of flow diagram made up of flat plastic strips, each a different color according to type of flow. Front of control panel is covered with plastic, which adds to its attractiveness and ease of maintenance. Control panel was completely designed, assembled, wired, and tested at manufacturer's plant in New Jersey, then shipped complete by sea train to Texas City.

Results: Equivalent of triple-distilled water is being furnished by demineralization system. Capacity of system depends on dissolved solids in the

(*Please turn to page* 19)

For more information on product advertised at right, specify 1494 . . . see information request blank opposite last page.

Small valve takes on big job at U.S. Steel

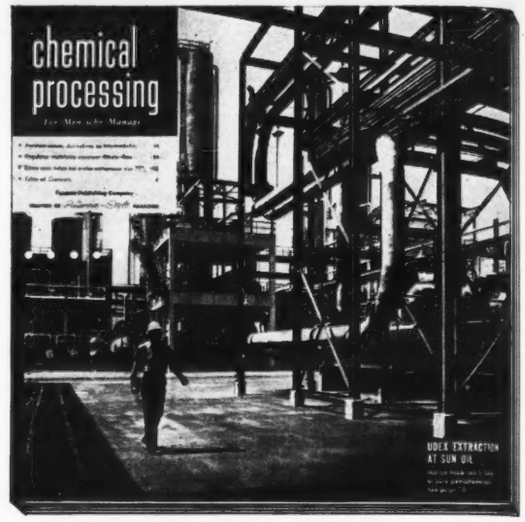
That's a 4" Aloyco Gate Valve of Aloyco 20 stainless steel guarding the outlet of one of the largest acid tanks ever built.

It's one of the new units erected as part of United States Steel's modernization of the Coke and Coal Chemical Division facilities at Gary, Indiana. Aloyco valves are widely used here in both the Otto Construction Corporation's ammonium sulfate saturators and in the solvent recovery units which were engineered by United Engineers & Constructors, Inc.

They're also widely used by other leading manufacturers in the chemical processing and petroleum industries. Perhaps Aloyco valves could save you money in handling corrosives. Want more information? Write Alloy Steel Products Company, Inc., 1301 West Elizabeth Ave., Linden, New Jersey. 6.27

Can you "pay for" a magazine like this?

with a $3.00 or $5.00 subscription?



This magazine costs more than $40.00 per year

Maybe you've thought publishers make money on a $3.00 or a $5.00 subscription . . . that that is why they ask you to subscribe.

No, it's not true . . . your $3.00 or $5.00 fall far short of "paying" for *any* really good business magazine.

The costs of printing, paper and postage alone usually exceed subscription prices. Editorial costs and other expenses run to many times that amount. And usually it costs more just to sell such subscriptions than they bring the publisher in dollars. So, the publisher actually "loses money" on such sales.

Then, why? . . . yes, *why* do some publishers charge a nominal rate for a subscription . . . but other publishers send their magazines without charge?

Well, the "paid-subscription" magazine gets a lower postage rate than does the "non-paid subscription" magazine. Some publishers feel this postal advantage is important. So they charge a "token fee" as a subscription price. And so win a lower postage rate.

But—whether you pay nothing, or such a "token fee," you — the reader — do not *really pay* for the magazine's service.

No—advertisers pay the bills . . . and so, logically, advertisers *demand* the best possible coverage of the important, key men of the field. That means folks like you, who exercise buying power.

CHEMICAL PROCESSING "hand-picks" its readers—for best, effective circulation . . . and sends the magazine to these key folks, without charge.

You see, you simply can't get maximum coverage of important folks by trying to force them to buy subscriptions. Such men, limited in numbers, are scattered all over the U.S.A.; travel and/or direct mail, cost money; a large share "forget to renew" each year; and, no matter how much time, money and pressure you put on them, there are always some important men who will never buy.

You don't "pay"—CHEMICAL PROCESSING gets better circulation. So, as you can see, a subscription price is at best but a "token payment." You don't really pay for any magazine with $3.00 or $5.00.

But, CHEMICAL PROCESSING gets the best, most effective circulation coverage by "hand-picking" the right readers. This gives values to advertisers which they can't possibly get in any other way.

That's why . . . CHEMICAL PROCESSING hand-picks only qualified readers . . . Men Who Manage chemical processing plants . . . presidents, partners, plant managers, foremen, engineers, chemists, directors of research, etc. Then the editors make the magazine so interesting, so valuable, these folks want to read it.*

That's why CHEMICAL PROCESSING spends many thousands of dollars on each issue — to give you this service costing more than $40.00 per year . . . without charge . . . as *you* are an important reader in the chemical field.

No, you can't "pay for" any good business magazine with $3.00 or $5.00. Whether you receive a "paid magazine" or a "non-paid magazine" you are still enjoying a valuable service — whose cost is far above any price you paid for a subscription.

**Every issue proves this qualified readership . . . by unequalled response from these key readers. May we show you the evidence?*

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"Executive Magazines for Industry"

BPA NBP

Demineralization System

(*Continued from page* 18)

river water. At 1440 ppm dissolved solids in incoming water, plant has capacity of 36,000 gph. If incoming water has only 600 ppm dissolved solids, rate of demineralization can be increased to 57,000 gph (nearly one-half million pounds per hour). Demineralizer is run at maximum capacity according to dissolved solids content of incoming water. Plant now has three sources of pure water, 1—demineralizer, 2—softener, and 3—condensate. As much water as possible is furnished by demineralizer, remainder coming from the other two sources.

For the first time, turbines in power house were found to be entirely free of solid deposits when they were inspected a few months ago. It will take longer to test effect of demineralized water on corrosion, but it is expected that corrosion will be reduced due to the removal of carbonates in the demineralization plant.

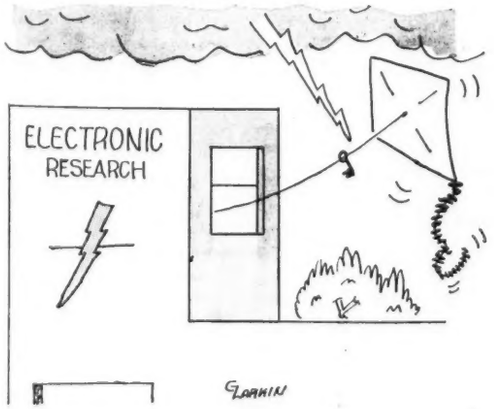
(For further information from company responsible for complete design and construction of demineralization system, in cooperation with Monsanto, check 1495 on form opposite last page.)

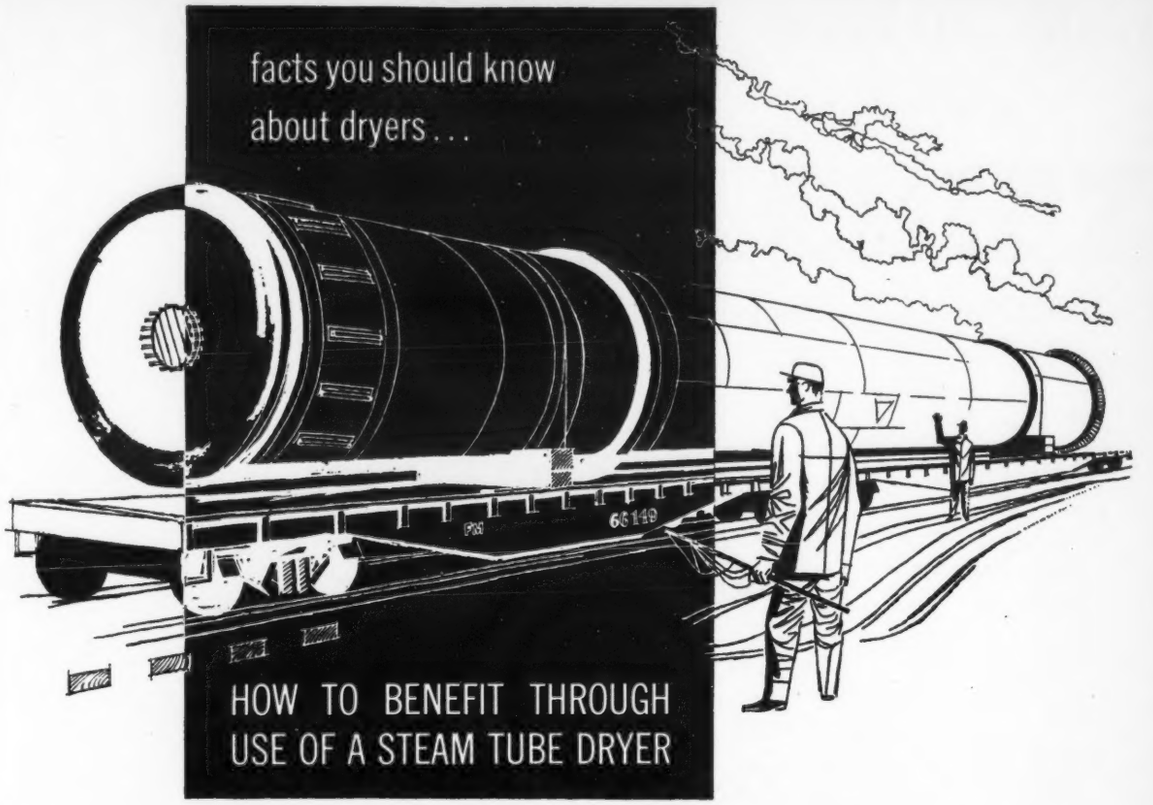
(Information on ion exchange resins IR-120, IR-45, and IRA-400 may be obtained by checking 1496 on form opposite last page.)

(For information on ion exchange resins C-20, C-25 and A-30 check 1497.)

(Further information on installation of structure for deaerator can be obtained by checking 1498.)

(For additional information on pneumatic instruments used in demineralizer check 1499.)





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Q. *Since avoiding dust loss and contamination by furnace gases indicates the choice of an indirect heat rotary dryer for my material, what type of indirect dryer would you recommend?*

A. Unless there are abnormal conditions, *we would recommend a steam tube dryer*, especially if the material is heat sensitive.

Q. What advantages does the steam tube dryer offer *in comparison with indirect fire types?*

A. There are many advantages. One is ease of operation and low maintenance costs due to the definite moderate temperature (established by steam pressure) imposed on both the material being dried and on the dryer itself. Another advantage is that there is no furnace refractory maintenance. Still another advantage is quick "warm up" and "cool off". In many cases where the drying operation is intermittent, there is no need to shut off the steam supply or stop rotation when the wet material feed is interrupted since steam is condensed in quantity only when wet material is fed.

Q. *Isn't steam supposed to be an expensive drying medium?*

A. That depends on how the steam is used. It is true that a low overall efficiency results (often as low as 25%) when steam is used to heat air for low temperature drying. However, the Louisville Steam Tube Dryer normally utilizes 85% or more of the available heat in the steam. By combining this with a reasonable minimum efficiency of 80% in modern small steam generators (and higher in large boiler plants), you get an overall efficiency close to 70%. This compares with indirect fire dryers which develop an efficiency seldom higher than 50% and generally less.

Q. *Does material insulate the tubes by sticking to them or by clogging the spaces between tubes?*

A. Very few materials have this tendency to any serious extent and most of these, when properly conditioned before feeding, handle without difficulty. For the balance, no dryer using heated surfaces for heating the material is a proper application.

Q. *How can I be sure a Steam Tube Dryer will handle and dry my material satisfactorily?*

A. The General American dryer pilot plant is at your service. No charge for routine tests and demonstrations. No obligation, either. Write for test date.

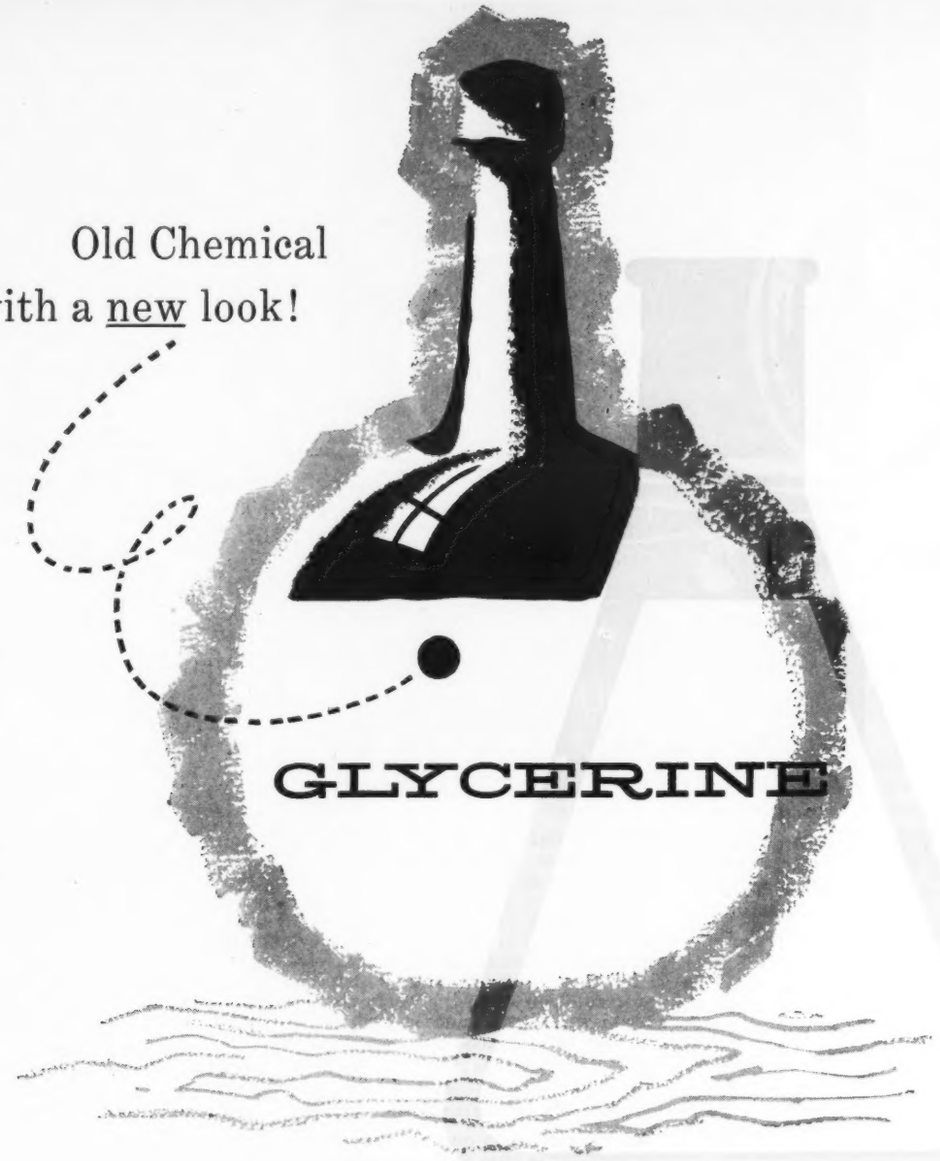
PROCESS EQUIPMENT DIVISION GENERAL AMERICAN TRADE MARK

LOUISVILLE DRYING MACHINERY UNIT

GENERAL AMERICAN TRANSPORTATION CORPORATION

Dryer General Sales Office: 139 So. Fourth Street, Louisville 2, Kentucky
Eastern Sales Office: 380 Madison Avenue, New York 17, New York
In Canada: Canadian Locomotive Company, Ltd., Kingston, Ontario, Canada
General Offices: 135 S. La Salle Street, Chicago 90, Illinois

When inquiring check 1500 opposite last page



. . . now more than ever a good buy!

Today you can specify glycerine with confidence . . . benefit from its many useful physical and chemical properties.

Shell glycerine meets industry's highest standards of purity, and is unsurpassed in uniformity.

Whether you order in drums or tank cars, Shell's conveniently located storage facilities assure prompt, dependable delivery. Write today for specifications.

SHELL CHEMICAL CORPORATION

CHEMICAL SALES DIVISION, 380 Madison Avenue, New York 17, New York

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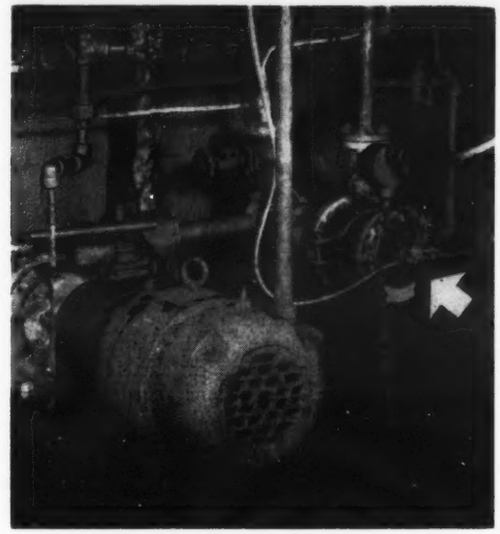
IN CANADA: Chemical Division, Shell Oil Company of Canada, Limited • Montreal • Toronto • Vancouver

When inquiring check 1501 opposite last page

Seal-less Centrifugal Pumps

(*Continued from page* 11)



Installation of seal-less pump (arrow). This points out small size and compactness of pump which minimized repiping and reworking of installation area when it was installed as replacement

loss of catalyst slurry.

Rebuilding job took two men two days. Pumps had to be inspected and completely rebuilt. Impeller shaft sometimes had to be metalized and machined, or replaced. Re-balancing of impeller and shaft was occasionally necessary. Frequent repacking was required. Combination of corrosion and abrasion, plus waste of catalyst slurry, added up to a costly operation.

Solution: Stuffing box pumps were replaced with one seal-less centrifugal pump (Chempump) — approximately a year and a half ago. Pump is 316 stainless steel with Monel impeller, rotor, and shaft. Because the pump is handling a slurry, a back flush through the pump of clear slurry carrier is used to keep particles away from bearing surfaces and out of the rotor chamber. Bearings are standard graphite type.

Since the pump is very compact, it was unnecessary to repipe or rework the installation extensively. Particular pump installed is ¾ hp, rated at 20 gpm and 68 feet total head. Power input is 3-phase, 220/440v AC. Pressure limit is 150 psi, and Class H insulation is used for stator windings. Cooling and bearing lubrication is done by means of circulation of polymer oil through rotor chamber. Pumping temperature is 140°F. Fluid being pumped has a viscosity of 25 cp and specific gravity of 1.13.

Seal-less centrifugal pumps are designed for operation with no leakage or contamination of pumped fluid. Pump and motor are built together into a

single hermetically sealed unit with pump chamber bolting directly to motor end bell. Pumped fluid is allowed to enter motor section but is isolated from stator windings by a non-magnetic, corrosion-resistant liner in the stator bore. Rotor and bearings are submerged in clear fluid.

Slurry is made up in large, agitated tanks and then pumped to the reactors. Catalyst returns from the reactor to the tank by gravity. Additional dry catalyst is added as make-up during process operation.

Results: Maintenance costs on slurry pumps have been cut 80%, based on time and material charges. The Atlantic Refining Company, as part of maintenance policy, requires the seal-less pump to be taken down and inspected once a month. But only bearing inspection and cleaning have been necessary. The operation takes two men half a day as compared with two days formerly required. Bearings are replaced twice a year.

(Chempump is product of Chempump Corporation, Dept. CP, 1300 E. Mermaid Lane, Philadelphia 18, Pa. Check 1502 opposite last page.)

Cites case histories of heating elements

Seven case histories are included in eight-page brochure on silicon carbide heating elements. Used in electric furnace and kiln operation, the elements have outlasted conventional nonmetallic heating elements up to three to one. Photographs of actual installations are included.

Bulletin "Savings With 'Hot Rods'" is issued by Norton Company, Dept. CP, Worcester 6, Mass. When inquiring specify 1503 on form opp. last page.

For more information on product at right, specify 1504 . . . see information request blank opposite last page.

NO TIPPING ALLOWED! Here's one tip the waiter doesn't have to worry about . . . because the tray perched precariously over the edge of the table is held securely in place by a hidden Eriez Permanent Magnet. This idea of herculean strength and permanent dependability has found a practical use in industry, where Eriez HI-POWR Magnetic Separators are used in processing lines to remove dangerous tramp iron before it can cause fires, product contamination, machinery damage and downtime. Eriez HI-POWR Magnets are also used to control, convey and hold metals, from small parts to large pipes. In addition, Eriez produces HI-VI electro-permanent-magnetic vibratory feeders and bin vibrators. *All Eriez HI-POWR Magnets are non-electric, self-contained. They operate without wires or attachments. Magnetic power is guaranteed forever; the first cost is the only cost.*

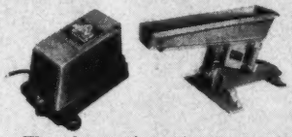
PULLEY PROTECTS PRODUCT PURITY! At the Libby food processing plant in Blue Island, Illinois, product purity is of prime importance. To prevent ferrous contamination of the processed food, an Eriez HI-POWR magnetic pulley was installed as the head pulley on a belt conveyor line that feeds tomatoes to the cooker. As the belt carries the tomatoes over the pulley, they fall into the cooker, while the tramp iron is held fast to the belt until it is automatically dropped out of the magnetic field. In addition to assuring a contamination-free product, the magnet has prevented machinery damage, and saves about 200 hours of down-time each season.

Magnetic ideas from ERIEZ

ERIEZ PLATE MAGNETS HAVE POWERFUL PULL! Magnetic attraction pulls tramp iron from *moving flows up to 4" deep* . . . and holds caught metal securely! Economical Eriez Plate Magnets are quickly and easily installed . . . provide maximum efficiency with minimum cost. They work equally well with wet or dry materials, withstand temperatures to 850°F. Available in fully enclosed stationary or hinged models, for installation on wood or steel, in or above flowing lines. All sizes. Strong, riveted construction. Many powerful strengths; depth and rate of flow determine magnetic strength to be used. Magnetic power is guaranteed *forever!*

New! Eriez HI-VI VIBRATORY EQUIPMENT

First complete line of electro-permanent magnetic vibratory equipment operating at 3600 CPM directly off an AC line. No rectifier needed! . . . just plug in. Greater vibratory output with less power consumption. Less maintenance; lower installation costs. Permanently powered guaranteed Alnico V magnetic element (heart of the unit) produces an exclusive "double action" drive for more productivity.



Write for complete information on HI-VI Unit (bin) Vibrators to keep bulk materials flowing freely. HI-VI Vibratory Feeders for accurate, controlled feed.

Patent Pending

ERIEZ HI-POWR MAGNETIC SEPARATORS

ERIEZ HI-VI VIBRATORY EQUIPMENT

DRAWER-GRATE MAGNET DRAWS GREAT PRAISE! To safeguard expensive precision equipment from tramp iron damage, the Toms River-Cincinnati Chemical Corp., manufacturer of vat dyes, installed a series of Eriez Magnets in their processing lines. One of these units is a stainless steel drawer type grate magnet, placed in the feed duct and hood of a micro-atomizer. Designed to remove stray metal from free-flowing lines, this unit has proved, according to company officials, "100% effective." It is daily trapping amounts of unwanted iron which could damage equipment and cause downtime. In addition to the enclosed grate magnet shown here, Eriez also makes a wing-type model for quick installation in open hoppers, bins, chutes, etc.

● *Eriez' free booklet "Magnetic Ideas" can help you. Send for it without obligation, ERIEZ MANUFACTURING COMPANY, 73P Magnet Drive, Erie, Pa. OR on your specific request Eriez factory-trained field men backed by Eriez' laboratory and engineering know-how, will be happy to study your particular problem, make a plant survey and offer helpful "Magnetic Ideas."*

TRI-CLOVER

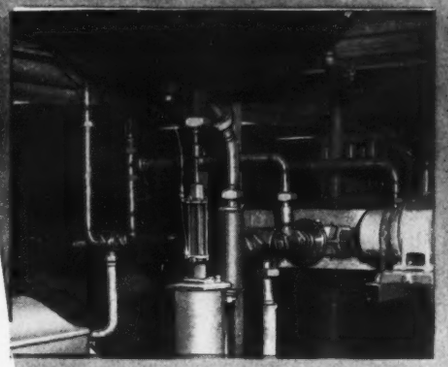
Stainless Steel Fittings help control quality at A. B. DICK COMPANY plant

A. B. DICK® is a name known for highest quality duplicating machines, folding machines, and impression paper. At their ultra-modern plant in Chicago, this progressive company makes certain that their reputation for quality is protected in all phases of operation.

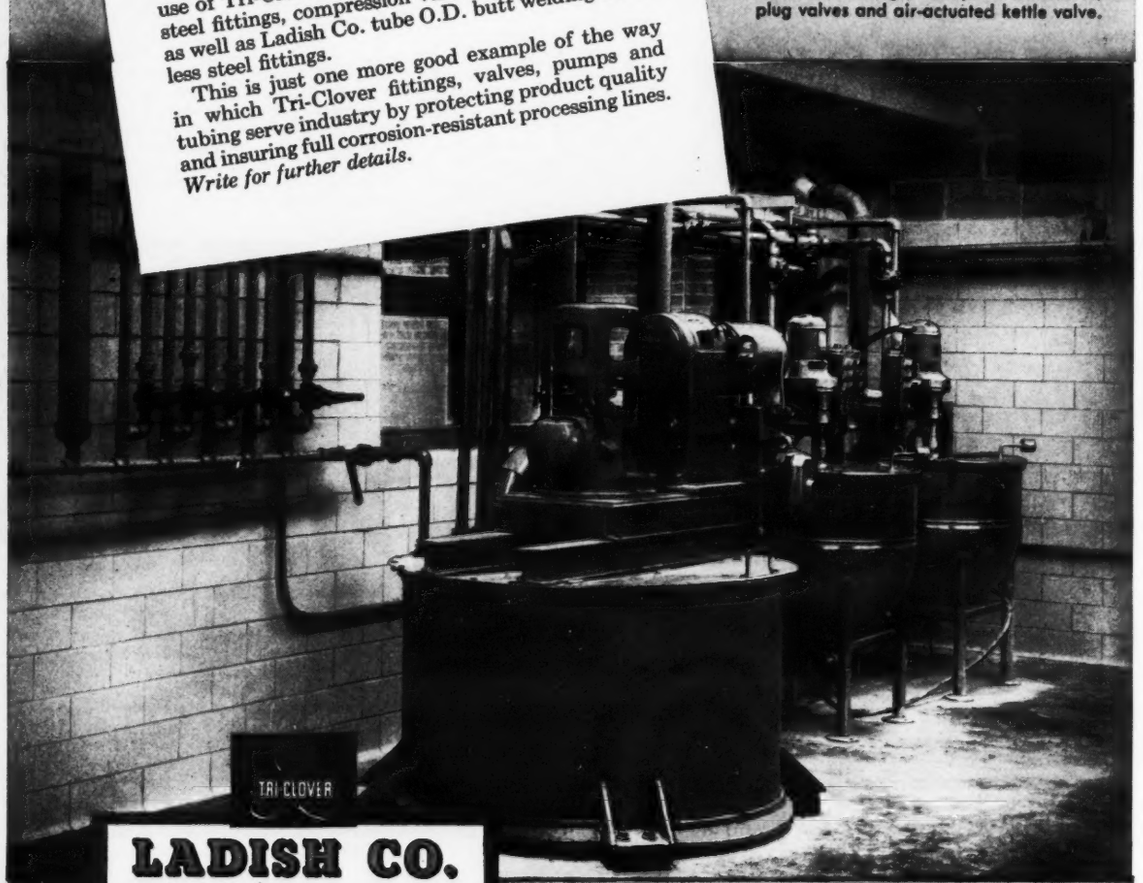
In making aqueous base clay paper coatings, for example, A. B. DICK Company makes extensive use of Tri-Clover Division's sanitary type stainless steel fittings, compression valves, and plug valves, as well as Ladish Co. tube O.D. butt welding stainless steel fittings.

This is just one more good example of the way in which Tri-Clover fittings, valves, pumps and tubing serve industry by protecting product quality and insuring full corrosion-resistant processing lines.

Write for further details.



Shown below is the mixing room where aqueous base clay paper coating is prepared, using Tri-Clover fittings and valves. The view above is a close-up taken from underneath the coating mixer, showing Tri-Clover fittings, compression valves, plug valves and air-actuated kettle valve.



LADISH CO.
Tri-Clover Division
Kenosha Wisconsin

See your nearest TRI-CLOVER Distributor

EXPORT DEPT., 8 So. Michigan Ave., Chicago 3, U.S.A.

1256

When inquiring check 1505 opposite last page

Laborious operation converted to a push-button job with bale breaker . . .

one operator now does work formerly requiring seven-man crew

Problem: A force of seven men was required to open 400 lb bales of jute cuttings at Fabrica Argentina de Alpargatas SAIC of Buenos Aires, Argentina. Jute is used for making hemp sandal, bagging, and other textile products. Fiber is so tightly compressed that the bales are difficult to break apart. Workers with sledge hammers would pound the baled material until it broke apart piece by piece.

Solution: About a year ago company installed an automatic bale breaker. Bales are placed on feed end of this machine and are forced by hydraulic action against opening cylinder. This opening cylinder is equipped with teeth spiraled around the cylinder which break the bales open and tear the material apart, separating it into the individual cuttings. It is delivered in this condition to the apron of the machine and then it passes on to other subsequent operations.

Results: What formerly was described as a laborious, almost inhuman operation, has been turned into a push-button job. Instead of seven men working at opening up the bales, only one man is now required. This one man now takes care of opening eighty 400 lb bales in an eight hour shift.

(Bale breaker is manufactured by Taylor Stiles & Co., Dept. CP, Bridge Street, Riegelsville, N.J. Check 1506 opposite last page.)

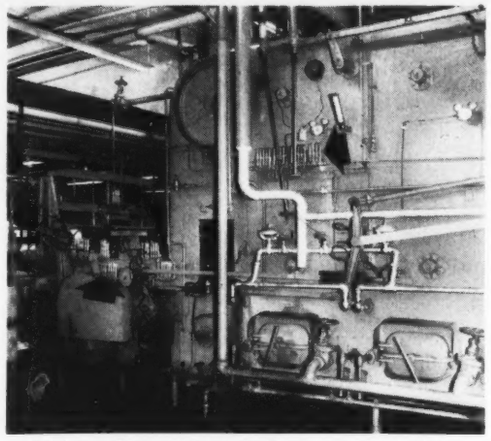
Bearing wear is reduced, maintenance cost cut at Anheuser-Busch . . .

centralized system lubricates 1080 points automatically and uniformly

Problem: Bearing wear and maintenance costs were too high on five bottle washers and bottle unloaders at Newark Brewery of Anheuser-Busch, Inc. Each washer has 157 lubricating points, each bottle unloader 59 points, for a total of 1080. Despite care taken by personnel, some points were missed and manual lubrication was not uniform. Increased bearing wear resulted in higher maintenance costs.

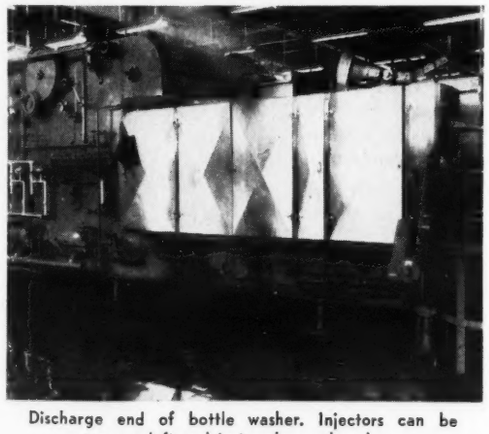
Solution: A centralized lubrication system was installed in 1954 to handle all five washers and unloaders. System consists of a pump, feed lines, injectors, and an automatic timer. Operation is as follows:

A predetermined frequency of lubrication cycle is



Bottle washer at Anheuser-Busch. Arrows indicate some of the injectors which deliver lubrication to 157 separate points

set. When cycle starts air supply is passed from main line to air motor of pump. Lubricant, under pressure, is dispensed through supply lines, discharging injectors at line pressure. Injectors automatically recharge when pressure is relieved in supply line, completing lubrication cycle. Electric motor can be used in place of air motor for



Discharge end of bottle washer. Injectors can be seen on left and just under washer doors

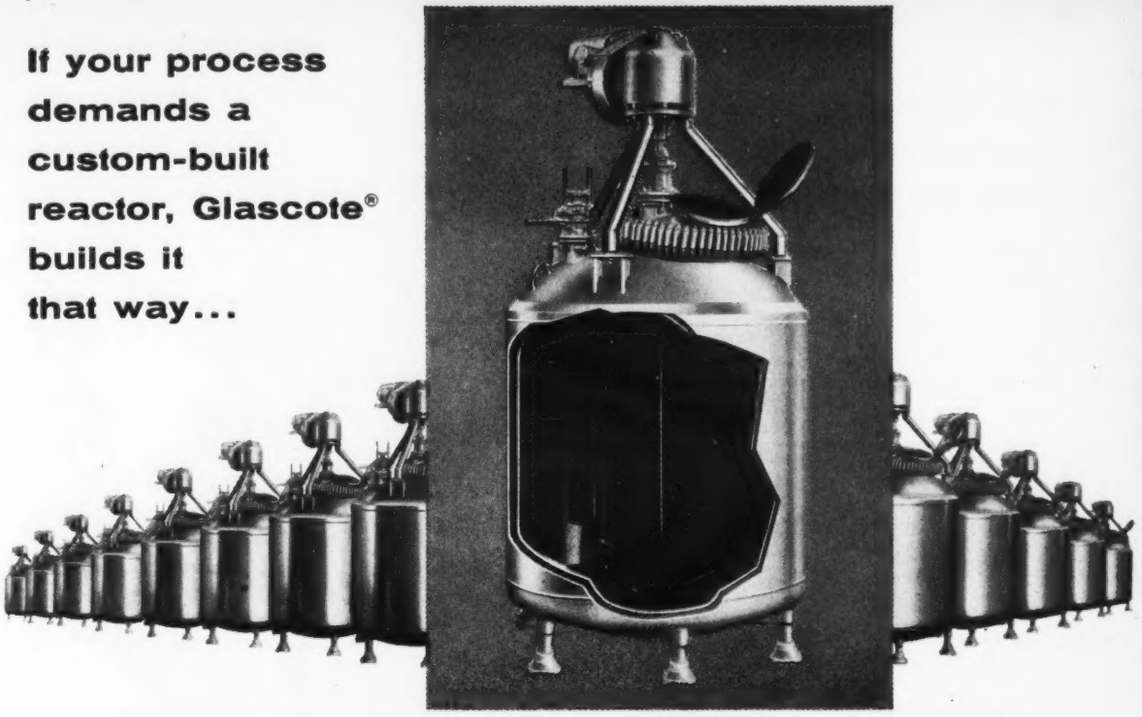
pump. Injectors can be set to deliver exact amount of lubricant desired.

An Anheuser-Busch system is set so that lubrication occurs once every eight hours.

Results: Practically no bearing failures have occurred since lubricating system was installed in 1954. Maintenance crew checks system daily for possible broken hoses or other items.

(Centralized lubrication system was supplied by Lincoln Engineering Co., Dept. CP, 4010 Goodfellow Blvd., St. Louis, Mo. . . . or for more information check 1507 on form which is located opposite last page.)

If your process demands a custom-built reactor, Glascote® builds it that way...



...if a standard reactor will do— Glascote can help you too

AVAILABLE IN A RANGE FROM 300 TO 2000 GALLON CAPACITIES

Our standard one-year guarantee continues to apply to all Glascote glass-lined products.

GLASCOTE has accelerated its reactor production to include standard designs in the HR (heavy-duty closed), CR (clamp-top) and SR (standard closed) series reactors.

Outstanding features include Glascote's exclusive leak-proof mechanical seal, glass-coated agitator and baffle. Whether it's blending, mixing or gas absorption, here's a surprisingly economical way to enjoy the superior characteristics of Glascote acid-alkali-resistant glass lining, for *all types* of corrosive processing. Sets new standards in product purity . . . longer equipment life.

Glascote also gives you non-stick glass linings for polymer production. And of course, Glascote will continue to make custom-built reactors in capacities to 4000 gallons and larger. Internal and jacket pressures to meet your exact specifications.

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Ask the representative who calls on you for all the facts about Glascote products — reactors, storage tanks, columns, conical rotary dryer-blenders, receivers, condensers and accessory products. Or, if you prefer, write direct. Glascote Products, Inc., Cleveland 17, a subsidiary of A. O. Smith Corporation.

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Permaglas water heaters
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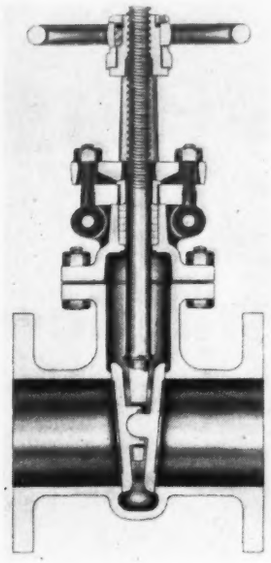
Glass-lined bulk storage units
Glass-lined aircraft electrical equipment
Glass-protected (inside and out) smoke stacks

When inquiring check 1508 opposite last page

Sulfuric acid sludges handled with valves having integral stem and disc carrier

Eliminates failure that occurs where threaded stem is fastened to disc

Problem: The Atlantic Refining Company, Philadelphia, found that valves used for handling sulfuric acid sludge failed frequently at one point — the threaded joint where the stem is fastened to the disc. Valve would often be in satisfactory operating condition except for corrosion at this one point.



Disc carrier is forged integral with stem, eliminating threaded connection

Solution: For this service, Atlantic switched to a flanged valve which does not have a threaded joint between stem and disc. The disc carrier is forged integral with stem, eliminating a threaded connection. Split wedge is a two-piece, self-aligning type — which assures good seating. All parts are Durimet 20; Teflon packing is used.

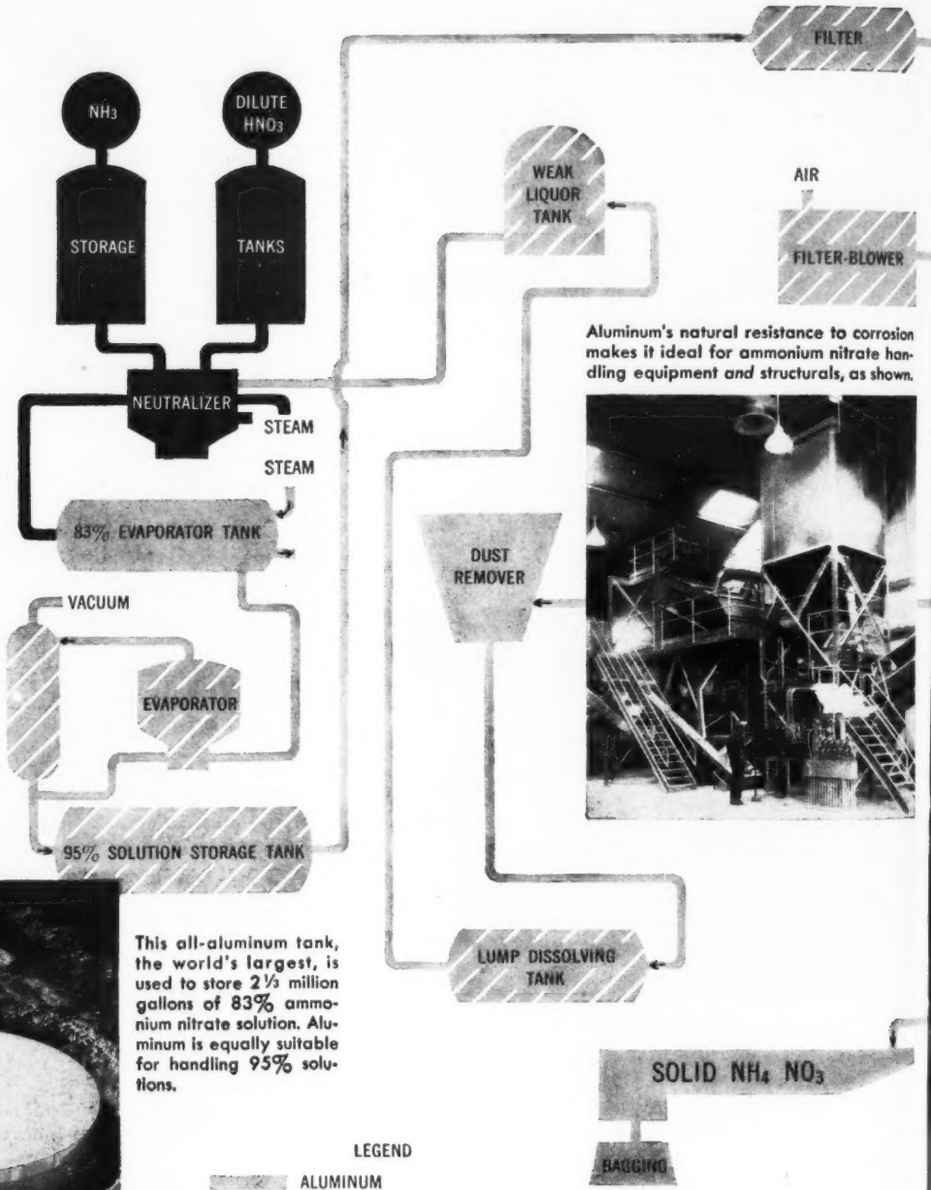
Plant is using about 25 valves of this type, 1 to 6" in size, most of which are in sulfuric acid sludge service. Sulfuric sludge varies in temperature from 100 to 180°F.

Results: Since there are no threads to corrode, failure at the stem and disc joint of valves has been eliminated. Present valves are giving good service handling the sulfuric acid sludge.

(Fig. No. 8550 valves used at Atlantic are product of Pacific Valves, Inc., Dept. CP, 3201 Walnut Ave., Long Beach 6, Calif. . . . or for more information check 1509 opposite last page.)

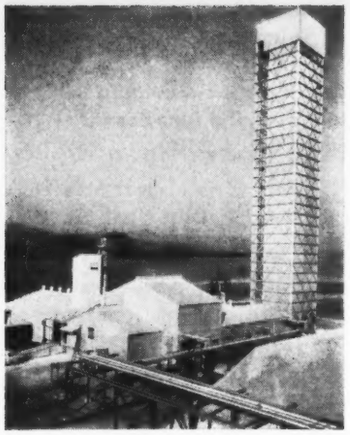
This month's Processing and Engineering Data section starts on page 208

PRODUCTION OF SOLID AMMONIUM NITRATE

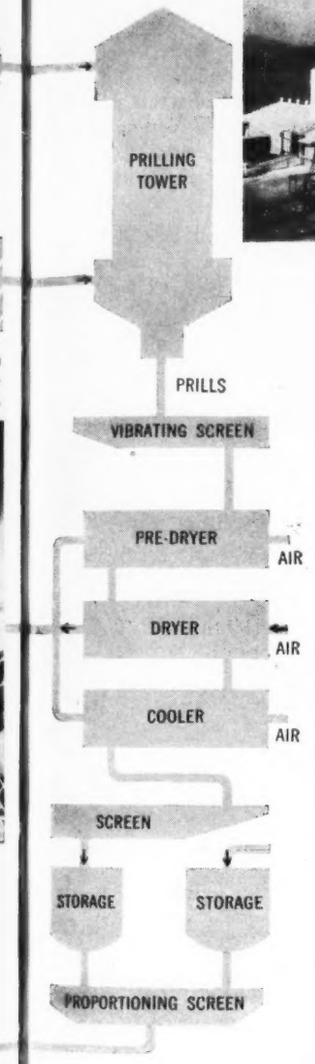


Aluminum's natural resistance to corrosion makes it ideal for ammonium nitrate handling equipment *and* structurals, as shown.

This all-aluminum tank, the world's largest, is used to store 2⅓ million gallons of 83% ammonium nitrate solution. Aluminum is equally suitable for handling 95% solutions.



This all-aluminum ammonium nitrate prilling tower is the tallest all-aluminum structure in the world—200 ft tall and 30 ft square. Frame, walls, piping, fittings, connections and fasteners all are aluminum to provide service uninterrupted by corrosion.



Eliminate over 50% of your corrosion trouble spots:

Specify Process Equipment of Alcoa Aluminum!

Here is a sound, low cost way to eliminate over 50% of the corrosion trouble spots in *your* process. The flow chart shows how it's done in a typical, highly corrosive operation. The answer: Specify process equipment of Alcoa® Aluminum.

Many liquids and gases normally corrosive to most metals will not corrode aluminum. It resists, successfully, attack by process materials *as well as* the corrosive atmospheres which often surround equipment. And aluminum also offers you this unique combination of highly desirable benefits: low cost . . . light weight . . . good workability . . . high thermal conductivity . . . excellent strength in alloys . . . nonmagnetic, nonsparking characteristics . . . nontoxicity . . . and excellent reflectivity.

Consider, too, *this* important fact about aluminum: no one has had more experience with the light, corrosion-resistant metal than Alcoa—the aluminum pioneer. Alcoa engineers have worked with aluminum in the process industries for over 30 years. Their accumulated knowledge of corrosion problems is yours for the asking.

Find out how *you* can free yourself of many of your corrosion headaches . . . by specifying process equipment of Alcoa Aluminum. Tell your nearest Alcoa representative about your corrosion problems —or write Aluminum Company of America, 902-B Alcoa Building, Pittsburgh 19, Pennsylvania.

THE ALCOA HOUR
TELEVISION'S FINEST LIVE DRAMA
ALTERNATE SUNDAY EVENINGS

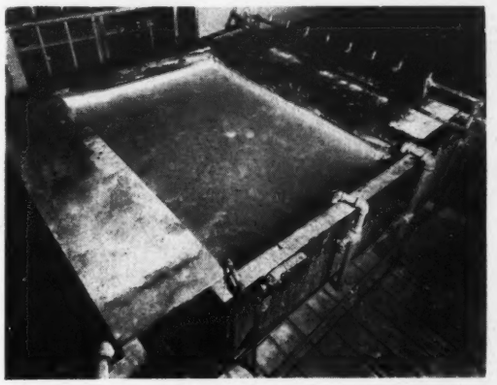
ALCOA ALUMINUM

THIS FREE BOOK can be your guide to corrosion-free process equipment. Its 80 pages are packed with information on the behavior of aluminum in the process industries. Write today for *Process Industries Applications of Alcoa Aluminum.*

When inquiring check 1510 opposite last page

Over five years trouble-free service from low-cost agitating system at Reynolds Metals Company

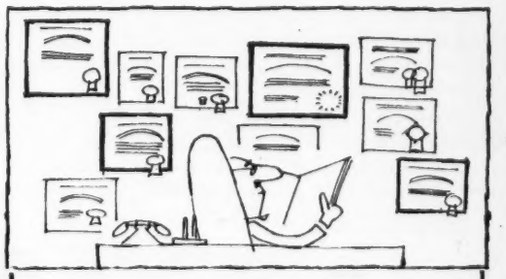
Caustic and similar chemical solutions are stirred efficiently and economically by a practically maintenance-free system at Reynolds Metal Company, Louisville, Kentucky. The solutions are agitated in 7-ft-deep steel tanks by introducing compressed air at about 10 psi through perforated pipelines near bottom of each tank. Originally installed in 1951, the system has been operating two shifts per day without difficulty since that time.



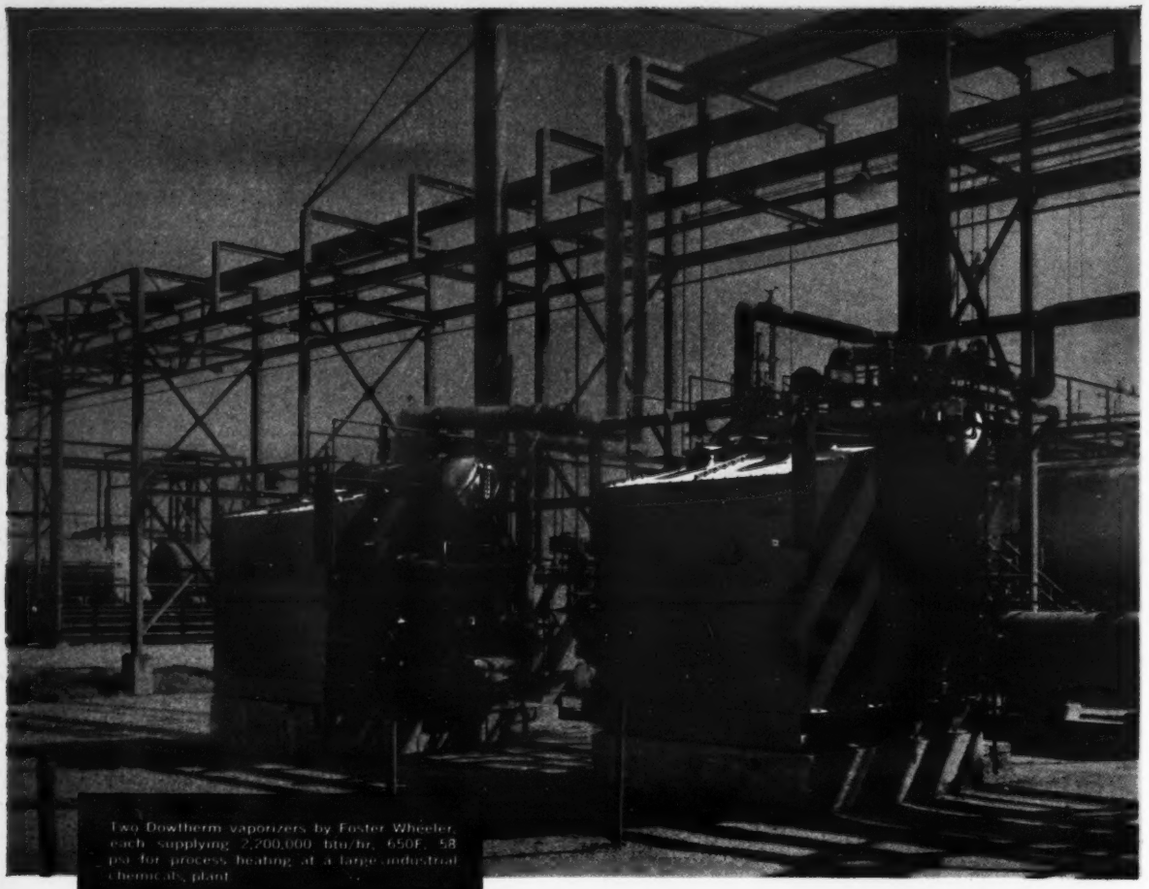
Solutions are agitated by introducing compressed air through perforated pipelines near bottom of tank

Air is supplied by an axial-flow, dual-rotor blower rated at 900 cfm. The two rotors operate with a clearance of a few thousandths of an inch, but actually never touch; hence there is no frictional wear nor any need for internal lubrication. Blower is driven at 1400 rpm by V-belt from a 75-hp electric motor.

(Model 9B16 Standardaire blower was manufactured by Read Standard Corporation, Dept. CP, York, Pa. Check 1511 opposite last page.)



if you're a VIP . . .
be sure to see page 81!



Two Dowtherm vaporizers by Foster Wheeler, each supplying 2,700,000 btu/hr, 650F, 58 psi for process heating at a large industrial chemicals plant

in high temperature, low pressure heating

ONLY FW DOES THE COMPLETE JOB

Design and Engineering. High temperature Dowtherm heating systems by Foster Wheeler are specially designed and engineered to meet your specific process requirements to best advantage.

Installation. Foster Wheeler can supply and install the complete heating system — making sure that every detail of the installation is right for the job.

Operation. Foster Wheeler responsibility follows through to the successful operation of the entire system. Proper functioning of all elements is positively assured.

Service. Foster Wheeler's skilled engineers and service personnel are available at all times—to assure continued trouble-free operation or to assist in any process changes or relocation of equipment.

During the past 23 years of service to the process industries, Foster Wheeler has installed over 500 Dowtherm heating systems, in individual units from 44,500 to 45,000,000 btu/hr, 700F, 88 psi. We will be glad to study your requirements and point out how FW high-temperature, low-pressure heating systems will improve your process and cut your heating costs. For complete information, write for Bulletin ID-54-5. *Foster Wheeler Corporation, 165 Broadway, New York 6, N.Y.*

FOSTER WHEELER

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When inquiring check 1512 opposite last page

Use of plastic-steel material for repairing large valve saves plant $800 . . .

material is easily molded on valve by hand in five minutes

A large company recently saved $800 and many hours of lost production time by repairing a large valve with a material consisting of 80% steel and 20% plastic. Product, which can be molded as easily as clay, was applied to valve in about five minutes.

First a blowtorch was used to dry and heat the broken section of valve. Plastic material was applied, then warmed slightly with flame. Because flame was used, material was hard in less than two minutes and valve was back in service.

The plastic-steel product, known as Devcon, is resistant to most acids and alkalis. Chemical companies have used it to repair pipes, tanks, and other equipment. For example, a large chemical plant in Florida used the material to build up the surface of centrifugal pumps which had been worn away by abrasion and corrosion.

Two types of the product are available: 1) a putty type that can be applied to a vertical surface and will not run or sag; and 2) a viscous liquid that can be poured. Hardening agent, supplied with each can, is stirred into plastic just before use.

(Plastic-steel material is product of Devcon Corp., Dept. CP, Danvers, Mass. . . . or for more information check 1513 on form opposite last page.)

". . . and here's how we demonstrate the strength of our . . ."

chemical business

Trends in the chemical world . . . what they mean to you as reported by the editors of CHEMICAL PROCESSING

IN THIS ISSUE:

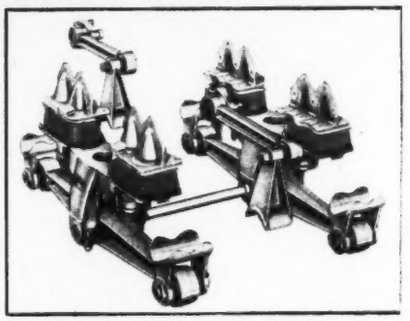
Grace Chemical Company . . . "Greatest strength is in diversification" page 31

$175 million nickel-producing operation for International Nickel of Canada page 32

Sales of GE's irradiated polyethylene reach "full-scale" proportions page 34

All-titanium compressor rotor for jet aircraft engine

Titanium pace quickens . . . Allied-Kennecott expects 10% of titanium metal market by 1960 page 29



The unique design of the "load cushion" accounts for smooth, even rides in the full range of loads, empty to full. Enjay Butyl Rubber (in red) made it possible.

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replaces steel springs in big Tractor Trailers

The "load cushion" is an important innovation in tandem suspension. Developed by the Hendrickson Mfg. Company, it is made of Enjay Butyl and replaces steel leaf springs. Utilizing the great strength and impact resistance of Enjay Butyl, the "load cushion" gives the ultimate in a soft, easy ride within the complete range of loading, from empty to full. Besides giving a smoother, steadier ride, it increases tire mileage, reduces weight and significantly reduces wear and tear on equipment.

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chemical business

FEBRUARY 1957

Vol. V No. 2

Highlights

Rubber stockpile outdated . . . says Goodrich's John L. Collyer. "Not a question of 'whether' the stockpile is liquidated, just 'when' and 'how' . . . regardless of peace outlook. . . . . page 29

Another titanium producer . . . Allied-Kennecott being formed to produce the metal by continuous process . . . and hints of still another chemical titanium process. . . . . page 29

W. R. Grace . . . growing strength in chemicals. Fluorine compounds, acetylene chemistry, polyolefins, nitroparaffins, and rare metals in the future? . . . . . page 31

International Nickel of Canada . . . announces plans for $175 million nickel-producing operation in Northern Manitoba. . . . . page 32

GE's Irrathene . . . "first commercial production and marketing for irradiated polyethylene products." But Grace's Hyrad process offers formidable competition for market. . . . . page 34

Rubber stockpile not needed says rubber executive

In a pretty strongly worded recommendation that the Government "should plan now to prevent a large loss to taxpayers," **John L. Collyer,** B. F. Goodrich's board chairman, urged immediate disposal of excess quantities of rubber and formulation of plans for eventual complete liquidation of the stockpile.

"It is no longer a question of 'whether' the stockpile should be liquidated, but rather a question of 'when' and 'how'. This is true regardless of the outlook for peace. With the recent development of chemically-made 'natural' rubber, we need no longer be dependent on foreign sources, whether in peacetime or war."

Background on stockpile is this: It was created to insure, in event of war, adequate quantities of natural rubber. Until recently, large truck, bus, and airplane tires could not be made satisfactorily from synthetic rubbers. Now, with man-made rubbers, people consider the stockpile too large.

Another factor in the argument is that synthetic rubber capacity is being rapidly expanded. It is expected that by the end of 1957, through expansion programs now underway, capacity will be increased 20 percent over 1956. This will be more than adequate as far as our present consumption is concerned. (It is expected that synthetic ratio to total rubber consumed in 1957 will be 62% with no great increase in total rubber.)

What does the Government think about all this? Of course, they would like to see us independent, but, probably, responsible officials feel that we should go about it cautiously. First of all, these man-made rubbers will have to be proven beyond a doubt.

The rubber industry has stated its feelings. Now the next move is up to the Government.

Titanium – now by continuous process

Newest activity in the quick-paced titanium metals industry is announcement of venture into metal producing and selling by Allied Chemical and Kennecott Copper. Forming joint subsidiary to produce and market the metal, Allied-Kennecott will use wide technological resources of the parent companies. Proposed plant goes on-stream with new continuous process.

Contribution by Allied will be the new process, said to be distinctly different from any now being used. (Sodium is used as reducing agent for converting titanium tetrachloride to sponge.) Allied also has an improved process for production of the tetrachloride. Titanium slag — from iron-titanium ore — can now be used as the raw material.

Kennecott's subsidiary, Chase Brass and Copper, has developed processes for melting and fabricating titanium to be included in the operation. Large scale capital requirements of entering the industry are suggested by $40 million initial stake of Allied-Kennecott.

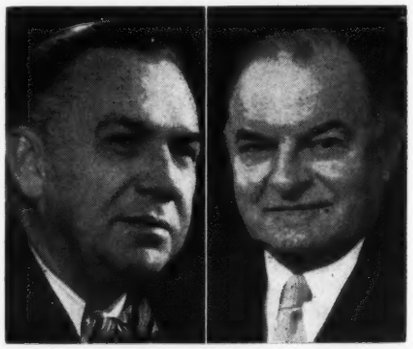
While capacity data have not been disclosed, the new company expects to have a 10% share of the national market by 1960. Production of titanium tetrachloride, titanium sponge, and billets isn't expected to start until late in 1958.

Plant site hasn't been decided, although choice has been narrowed down to two or three locations.

Why are chemical companies entering the titanium picture? In many ways only chemical companies have the experience in chemical processing required for economical commercial production of the sponge. Dow, Du Pont, National Distillers, Union Carbide are some of the others already producing titanium metal and sponge.

Four melters and metal processors of titanium dominate the metal market today — Titanium Metals Corporation of America, Rem-Cru Titanium, Inc., Mallory Sharon Titanium Corporation, and Republic Steel Corporation. Two newcomers started operations in 1956 — Oregon Metallurgical and Harvey Machine Company. Both are melters. Even the melters and metal processors include chemical companies. Titanium Metals is owned by Allegheny Ludlum Steel and National Lead. Rem-Cru is a joint effort of Remington Arms and Crucible Steel.

Allied-Kennecott is entering an industry only six years old and characterized by steeply declining price curves and constantly increasing production.

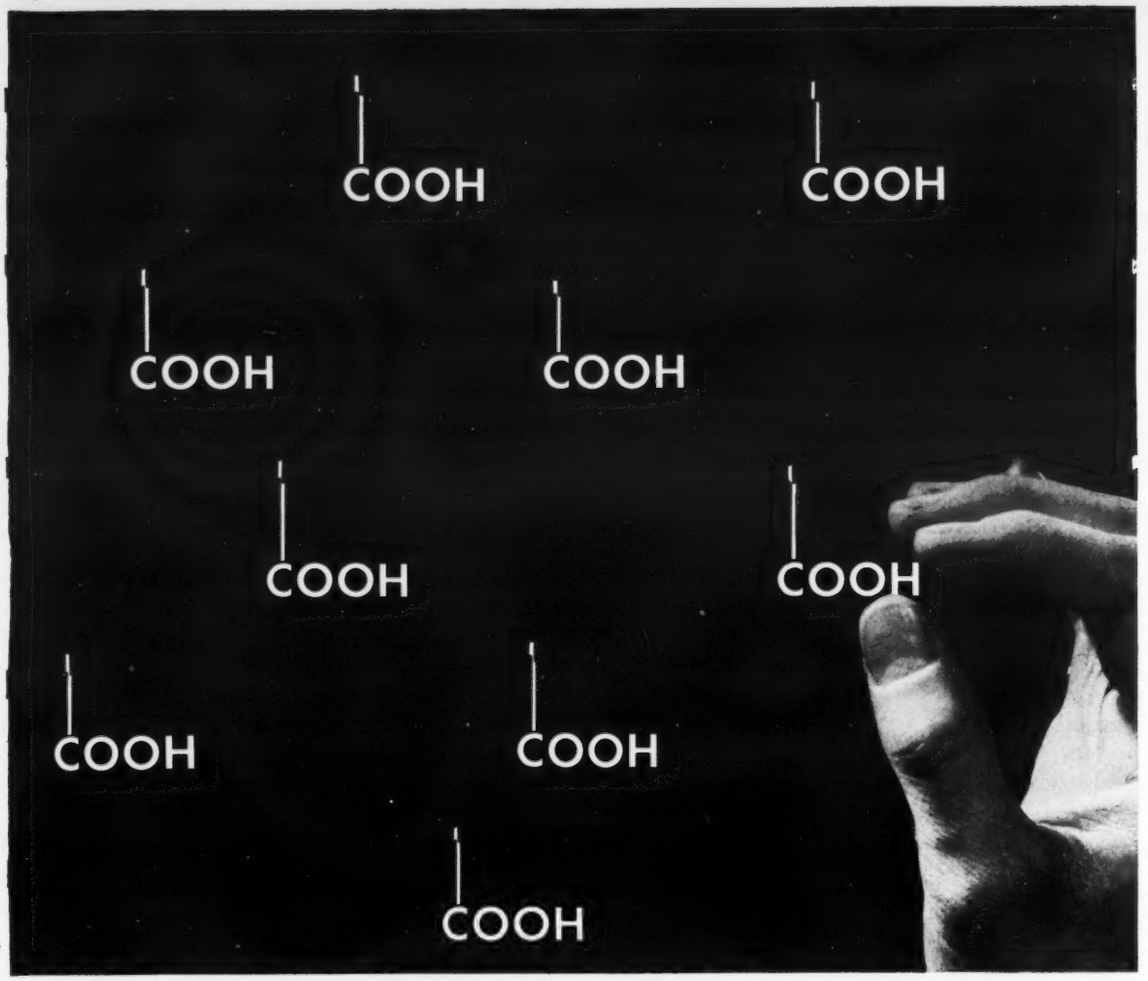


Charles Cox of Kennecott and Allied's Emmerich . . . hints of still another chemical titanium process

Dramatic downward price trend during 1956 is typical: Titanium Metals initiated an overall 6% reduction in mill-product prices on May 15 and followed with another 6% on December 3. Sponge price was also dropped on May 15 by Titanium Metals. Then, on July 2nd, Du Pont further dropped the sponge price to $3.00 from $3.25. Again on December 5 Du Pont reduced the price to $2.75/lb.

Production has shown a startling increase over the past six years. Starting with 50 tons in 1950, sponge produc-

(Please turn to next page)



How to add carboxyl groups to polymers ...copolymerize with methacrylic acid

By copolymerizing methacrylic acid with such monomers as styrene, acrylonitrile, butadiene, acrylates, methacrylates, or butadiene-acrylonitrile, you can get polymers containing free carboxyl groups. Copolymers can be made having one or more of the following advantages:

- **Can be cured with zinc oxide**
- **Produces more stable latices**
- **Soluble in alkali**
- **More oil resistant**
- **Improved adhesion**

Glacial methacrylic acid is readily available from full-scale commercial production. Write to Department SP for further information on this acid—just one of the many acrylic monomers manufactured by Rohm & Haas Company.

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(Continued from preceding page)

tion was 12,000 to 13,000 tons in 1956, and 25,000 to 28,000 tons in 1957.

Most of the titanium being produced is used for military applications, such as the all-titanium compressor rotor on page —. But the qualities which make the metal desirable for military use also make it a useful material of construction for many industries. The metal is corrosion-resistant and has a high strength-to-weight ratio. Allied-Kennecott expects the metal to have great potential for general commercial application. They're even dropping hints that another process for titanium is in the pilot plant and market development stage. The new process uses an iodide and gives a titanium with special properties.

New businesses. . .1.5 million of 'em

. . . by 1976, is the rosy prophecy of DuPont in its recently published booklet, "The Story of Business: Large and Small."

Now there are 4.2 million small firms, but by 1976 there will have to be 5.7 to keep pace with the present trends. And instead of 3500 large firms, there will have to be 7000, and they must be larger than today to provide the resources of money and men that new technological developments will require, says DuPont.

The booklet also predicts 19 million more jobs.

"These predictions merely project present trends, assuming there will be no catastrophe and that business growth is permitted and encouraged."

Copies of the booklet are available from DuPont, or check 1516 on form opposite last page.

Infringement case

. . . by B. F. Goodrich Company against United States Rubber Company on tubeless tire patent was dismissed. U. S. District Court in Baltimore ruled the Goodrich patent wasn't valid and U. S. Rubber was not infringing.

W. R. Grace – And Chemicals

Extent of Grace and Company's entry into the chemical industry since establishment of Grace Chemical Company in 1952 has been more fully disclosed. Smith, Barney & Company, eastern investment house, maintains the increasing emphasis being placed on chemicals and industrial operations has changed the nature of the company dramatically. The strength of Grace and Company now lies in its diversification and areas of development — chemicals, paper, oil, transportation, and production and sale of consumer goods in South America.

Of all the areas, chemicals is growing the fastest in its importance to the company. Chemicals now account for about 34% of total company sales and about 55% of total assets. Cash flow from chemical earnings in 1955 amounted to 45% of the total. Grace is even said to be developing a profit rate before taxes which is growing at a much higher rate than the aggregate of the chemical industry. Because of the company's diversification program and facilities, future expansion is thought by Smith, Barney, & Company to be: fluorine compounds, acetylene chemistry, polyolefins, nitroparaffins, and rare metals.

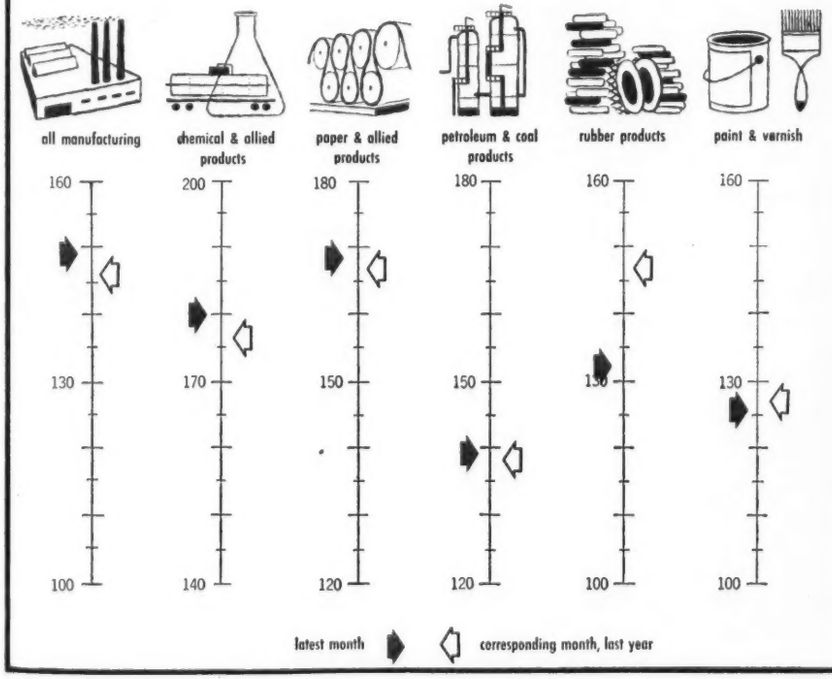
Rapid change in nature of Grace during 1950-1955 period could not be financed entirely from the company's own funds, although total depreciation was sufficient to handle about 70% of the capital expenditures. The remainder was secured from retained profits and long-term financing.

Copies of the Grace report are available from Smith, Barney & Company.

If you'd like to look one over check 1516A on Reader Service form which is located opposite last page.

chemical business INDEX

Production indices based on the index, 1947-49=100



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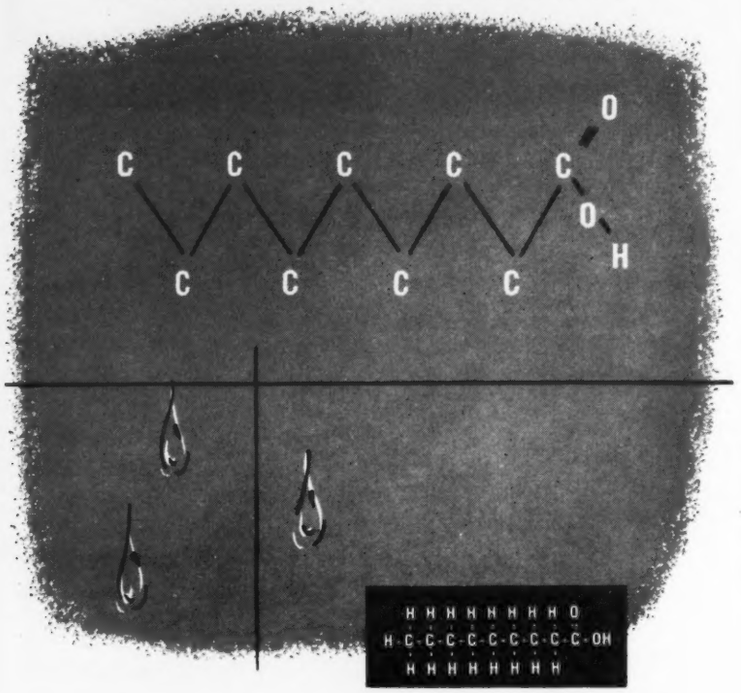

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Unlike naturally occurring acids that belong to an even-carboned homologous series, pelargonic acid, a C_9 acid, offers a unique combination of properties and molecular weight that could lead to unusual end-products. Such products include *condensates*, *alcohols*, *metallic salts* and *esters* for such fields as plasticizers, detergent additives, synthetic lubricants, stabilizers, greases, alkyds, etc.

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When inquiring check 1518 opposite last page

chemical business — Our Growing Industry

Major nickel-producing operation at $175 million cost

After spending $10 million and ten years in exploration, International Nickel Company of Canada is announcing plans for a $175 million nickel-producing operation in Northern Manitoba — and, at the same time, the company issued a price increase of 9½ cents per pound, bringing the nickel tab to 74 cents per pound.

Inco is to open two mines in the area with complete facilities for producing nickel by 1960. Project will constitute the biggest nickel-producing operation in the world next to Inco's operations in the Sudbury District of Ontario. Net boost in capacity will be approximately 130 million pounds annually.

In order to get the program under way immediately, Inco will finance all initial capital costs with its own funds but expects ultimately to be reimbursed for some expenditures. Agreement has already been made concerning reimbursement for construction of the required power plant and a 30-mile railroad spur line.

As presently projected, Inco's capital investment in Manitoba will be approximately $115 million. This will include costs of opening and developing two mines, constructing a concentrator, smelter, refinery, and transportation facilities plus providing certain town cite installations. The $115 million is exclusive of the $32 to $38 million power plant cost, approximately $5 million required for the Canadian National spur line, and $20 million estimated cost of homes building at the townsite.

Swedish-developed process

. . . for continuous extrusion of Dylite expandable polystyrene is basis for creation of new company to produce insulating materials. Dyfoam Corporation of New Castle, Pa., has applied for patents on its process to extrude sheets or slabs of Dylite, a product developed and produced by Koppers Company, Inc.

Pilot plant and production studies made in Sweden indicate considerable market potential. One advantage of the material is its low cost in comparison with other insulation materials.

Company anticipates that the present markets — cold storage warehouses, refrigerated trucks and railroad cars, general building construction, and residential housing — will justify almost immediate expansion of the initially small plant. Interesting property of material . . . it is said to be lightest rigid insulation material currently available, with a density as low as 0.9 lb/cu ft and K-factor of 0.25.

Construction contracts

. . . have been awarded SD Plants, Inc., construction subsidiary of Scientific Design Co., Inc. General Aniline's $8 million plant will produce 60 million lb per year of ethylene oxide and 35 million lb of ethylene glycol.

To correct impressions on butadiene

. . . that might have been left by reference on page 33, December CHEMICAL PROCESSING, butadiene production at Orange, Texas, plant of Firestone Tire and Rubber Company will NOT use Esso method. Butadiene to be produced at the Orange plant will be produced by the Houdry dehydrogenation process; it will be recovered by the Esso-licensed CAA extraction process.

Already, six Houdry dehydrogenation units are either on stream or under construction, mentions **R. E. Bland**, of

Houdry Process Corporation. Nominal design butadiene capacity from butane charge totals 308,000 annual short tons for all six. Design capacity of the Orange plant is 40,000 tons; other plants have capacities as large as 80,000 tons.

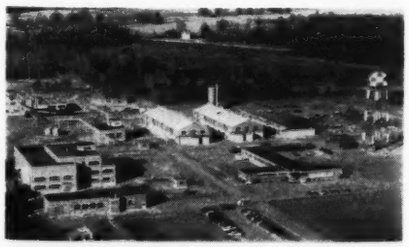
Fatty nitrogen compounds as intermediates

Opening the door to many new uses — that's the story behind the versatile fatty nitrogen compounds. Derived from fatty acids, these amines, nitriles, quaternary ammonium salts play a much more important role as intermediates than they do as end products.

On page 38, February Chemical Materials section brings you the lowdown on these products. Their chemical and physical behaviors are discussed. Various reactions are given suggesting possible products like thioamides and substituted acetamides for agricultural chemicals such as miticides and rodent repellents; alkoxylated amines and diamines as water soluble nonionic surface-active agents; and quaternary ammonium compounds from diamines as bactericides, germicides, and corrosion inhibitors.

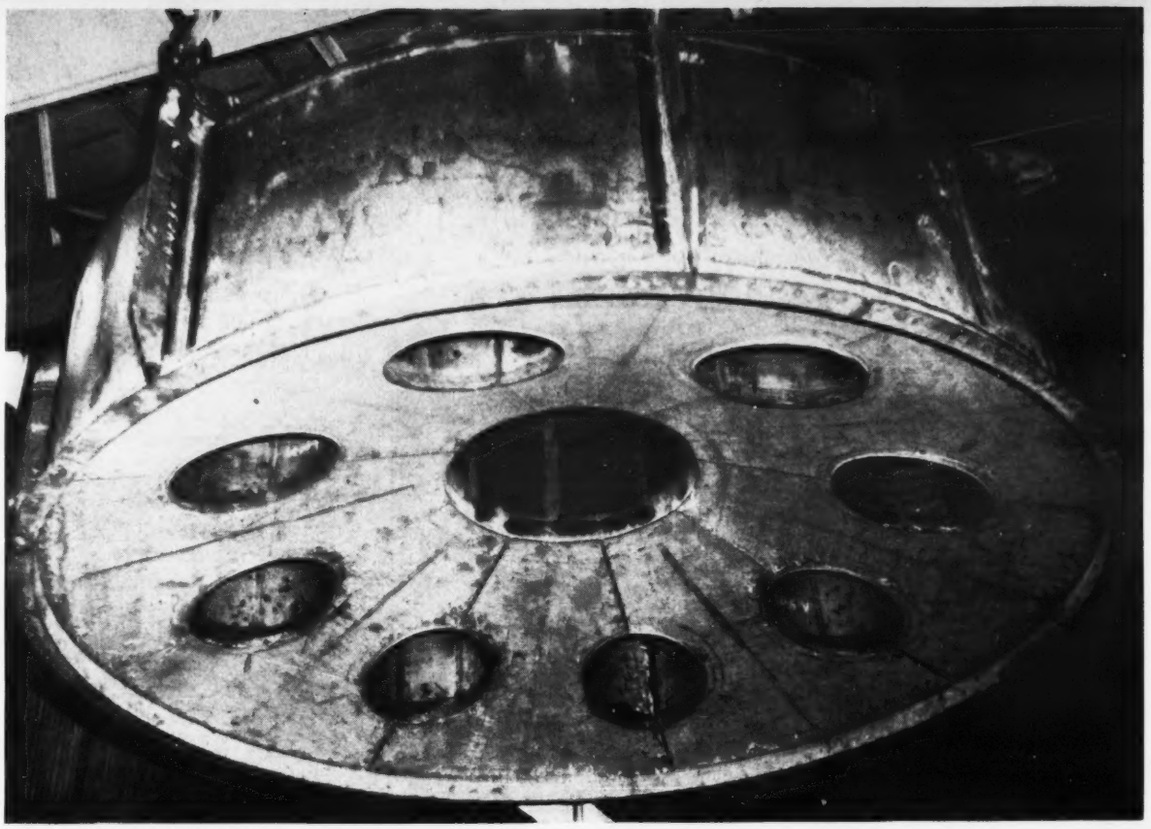
Recently completed merger

. . . between Oldbury Electro-Chemical Co., Columbus, Miss., and Hooker Electrochemical Co. has placed Hooker in the sodium chlorate business. At



Oldbury plant at Columbus, Miss.

the same time plans are being made to expand annual output at Oldbury Division from present 17,000 to 22,000 tons. The enlarged plant will be completed in 1958.



Hat size 240

Talk about ten gallon hats, here's a lid for a vaporizer that measures twenty feet in diameter. There were special problems of tailoring. There had to be stainless steel where the vapors flow to resist corrosion, and a carbon jacket to contain steam for heating.

The dome on top of this vaporizer acts as an inverted funnel. The holes you see in the dome are the outlets for the corrosive vapors. With an injection of steam, in the jacketed area of the dome, these vapors are re-heated to keep them in a gaseous state 'til they reach the next step in process.

More users and designers of process equipment are utilizing the "know-how" available at Chicago Steel Tank Company. This "know-how" assures you of a high-quality product at minimum cost whether your needs require fabrication from stainless steels, aluminum, nickel or any other alloy.

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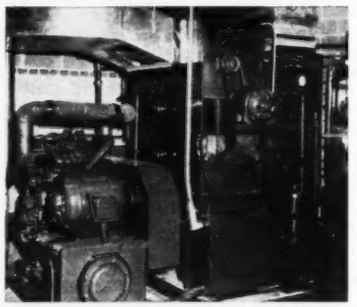
The cleanest because . . . no solids, salts or solutions of solids are used and there are no corrosive or reactive substances.



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chemical business

Marketing Trends

"Remarkable market growth" sparks electron chemistry

Commercial breakthrough has occurred for first commercial product of electron irradiation — irradiated polyethylene. General Electric's Irrathene is out of the development stage . . . into full-scale commercial production and use.

After two years of market testing and evaluation, GE has found that it has a successful business in irradiated polyethylene products. Product and manufacturing process are defined; production is going; and sales are being made in volume.

Significance of just announced plans to move into full-scale production is this: Irradiated polyethylene is experiencing a "remarkable market growth" according to **Louis Newman,** general manager of GE's new business. While present markets are mostly based on electrical insulation properties of Irrathene, GE hopes to tap the tremendous potential of the protective packaging and pressure-sensitive tape fields, to name only two.

First result of growing market was an upping of production from 300,000 to 1,600,000 lb annually — and a redoubling in the near future is in the works.

How did it happen at General Electric? Since the late 1940's considerable work has been done in the General Electric research laboratories on effects of radiation. Polyethylene was found to be a thermoplastic that was changed to a thermoset by irradiation. Then in 1953, the project was given to the chemical development department. Pilot plant construction was completed in July, 1954. Film and tape became available for market testing in December, 1954.

Two years later, Irrathene is considered a commercial success and sales during 1956 were "very satisfying." Pilot plant capacity was increased twice during the year to keep pace with sales. Sales during 1957 are expected to double again over 1956.

Competition may be nearing, though. W. R. Grace & Company is pushing its Hyrad process for irradiating polyethylene and other polymers. Hyrad, with Grace's modified polyethylene, also results in a product that retains its insulating properties at moderately high temperatures.

Grace's position on irradiated polyethylene is this: "Though commercial application has so far been limited to wire insulation, improvement in qualities opens new fields for polyethylene." **T. T. Miller** of Grace's polymer division visualizes uses in sterilizable containers, coatings, pipe and pipe linings.

Irrathene polyethylene is used to wrap coils for Sonotone's sintered plate batteries

But General Electric has completed market testing and evaluation, has a going business in irradiated polyethylene products. Grace may find it hard to overcome GE's lead — unless the future markets they both see turn into a reality.

Nuclear business

. . . opportunities will go to companies prepared to build a background in the field, according to **J. .W Blanton,** of National Research Metals Corporation. "Perfect opportunity" shouldn't be sought, but rather an area best suited to technical, managerial, and financial resources of the company. Mr. Blanton points out that such programs are necessary because AEC is not going to seek out a company and ask it to do work in an area in which it does not already have a high degree of competance.

Lower-cost nuclear power

Aim of Sylvania-Corning Nuclear Corporation will be right at the heart of nuclear power problem — costs. Entire field of reactor materials, components, and processes — including separation and recovery of spent fuels — will be objective of the joint activity of Sylvania Electric Products, Inc., and Corning Glass Works.

Don Mitchell of Sylvania, **Amory Houghton** and **William C. Decker** of Corning describe objectives of S-C

Discussing an atomic fuel element are executives (left to right) Houghton, Mitchell, and Decker

Nuclear as development and production of new and better fuels. Both companies will turn over their atomic energy businesses. Sylvania has an extensive background in metallurgy and fabrication of fuels for nuclear reactors. Corning has been engaged in applying high-temperature ceramic techniques to manufacture of nuclear

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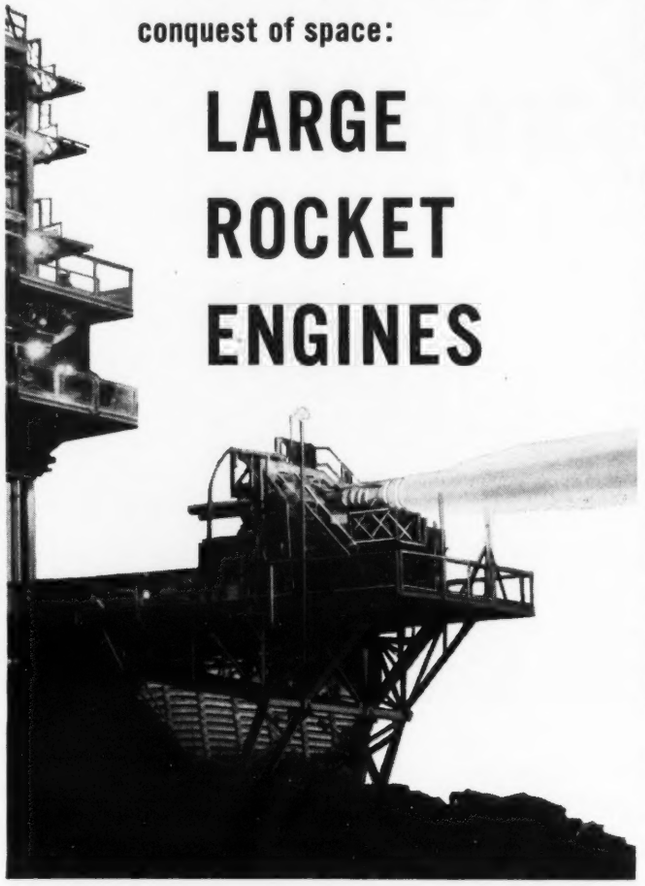

Tomorrow's count down already fills the air at ROCKETDYNE's 1,600-acre Field Test Laboratory in the Santa Susana Mountains near Los Angeles. For this is the free world's largest workshop for rocket engineering—the great new industry that is now attracting many of the finest scientific and engineering minds in the country.

EXACTING RESEARCH, EXCITING PROSPECTS

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What motivates a rocket engineer? Well, the material advantages are high; but it is the work itself that draws him most. He feels the same incentive that moved Magellan . . . spurred the Wright Brothers . . . and beckoned again to Goddard as he flew the first liquid rocket at Auburn, Mass. in 1926.

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INTERESTING BOOKLET: "The Big Challenge"—facts on design criteria and development approaches used at ROCKETDYNE. Write for your personal copy, specifying your degree and years of post-college experience. Address: A. W. Jamieson, Engineering Personnel Dept. 2-CP, 6633 Canoga Ave., Canoga Park, California.

WILLIAM J. CECKA, JR., 35, aeronautical engineer, (Univ. of Minn. '43), was called from North American by the Air Force for experimental rocket work in 1944. On his return, he progressed rapidly: 1948, supervisory test job; 1950, group engineer, operations; 1953 engineering group leader; 1955, section chief of engineering test. Using our refund plan, he has his M.Sc. in sight.

GEORGE P. SUTTON, in the 13 brilliant years since receiving his MSME, Cal Tech, has made rocketry a way of life. His reputation is world wide. His book *Rocket Propulsion Elements* is recognized as the standard text on the subject. Still active academically, but no bookworm, he takes time off occasionally to study the laws of motion at some of the world's better ski resorts.

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PITTSBURGH COKE is now *producing* and *shipping* from its new multi-million dollar phthalic anhydride plant!

Under construction since last year, this efficient new production unit is engineered to keep pace with the chemical industry's steadily growing needs for basic supplies of high purity phthalic in both flake and molten form.

Now, more than ever before, you can count on Pittsburgh for the prompt deliveries and uniform phthalic quality that eliminate many of your production troubles.

Call in a Pittsburgh man today! He'll show you how to solve your P.A. supply problems *before* they happen—by going with Pittsburgh in '57!

CALL

NEW YORK OXford 7-9050
PITTSBURGH ATlantic 1-2290
CLEVELAND CHerry 1-2170
CHICAGO CEntral 6-1760

COAL CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON

When inquiring check 1522 opposite last page

(Continued from preceding page)

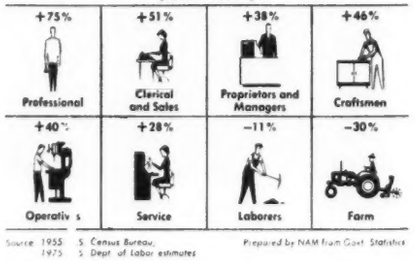
fuel elements and related components.

Site for new company's research, development, and production activities will be in power-hungry Northeastern United States. More than 50 locations were investigated, final choices are limited to several located in Northeast. Significance of location may lie in opinions expressed by Sylvania and Corning officials. "As far as the United States is concerned, continued economic growth in certain areas, particularly the Northeast, faces the obstacle of rising conventional fuel costs. This problem can only be met through extensive use of atomic power to generate electricity."

Greatest percent change

. . . in employment over next 20 years will concern professional workers — a 75% increase. Figures prepared by National Association of Manufacturers and based on US Dept. of Labor data forecast future employment opportunities. At the same time, report forecasts an increase in total jobs with an anticipated 35% growth in population. Technological advances are cited as principal factors contributing to general increase in skill levels of total labor force.

Percent Change in Employment by Occupations (1955-1975)



Source: 1955 U. S. Census Bureau, 1975 U. S. Dept. of Labor estimates — Prepared by NAM from Govt. Statistics

Craftsmen, operatives, and laborers will show an overall estimated increase of 34%, according to NAM estimates. Craftsmen are expected to increase by 46%, operatives by 40%, but number of persons in unskilled labor classification is expected to drop by 11%. Decline is also predicted in number of farm workers.

chemical business

Spotlight on People

R. Wolcott Hooker, senior vice president of Hooker Electrochemical, is reelected president of the Synthetic Organic Chemical Manufacturers Association.

New board members at Owens-Corning Fiberglas . . . **Robert T. Stevens,** president of J. P. Stevens & Co., Inc. and **Howard J. Morgens,** executive v-p for Proctor & Gamble.

J. D. Wright, E. A. Daniels, B. M. Van Cleve and **N. E. Van Stone** have been elected to Sherwin-Williams' board of directors. And **E. Colin Baldwin** is named executive vice president and a director of Sherwin-Williams Co. of Canada, Ltd.

News at Dow . . . **Gage Olcott** heads merchandising section of plastics sales, while **Arthur M. Griswold** takes position of manager, foreign research operations on the executive research staff. Two new sales executives for Dow are **G. J. Williams,** holder of newly created post of assistant to sales manager of plastics and **Amos L. Ruddock,** sales manager of recently formed textile fibers department.

Willard C. Lighter becomes executive vice president of The Glidden Company.

At polymer chemicals division of W. R. Grace . . . **John Peterson** is new sales manager, Midwestern region; **Donald H. Getz** joins technical department as senior process engineer; and **Berndt K. Lyckberg** is made general manager of high density polyethylene plant at Baton Rouge.

H. W. Strong Jr. is appointed vice president in charge of operations for Colton Chemical, a division of Air Reduction.

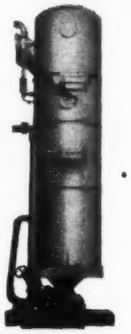
New production posts at Monsanto . . . **Robert M. Morris,** assistant general manager of organic chemicals division; **Howard L. Minckler,** director of manufacturing for organic chemicals division; **Russell L. Miller,** manager of John F. Queeny plant in St. Louis; **Richard J. Kozacka,** manager of Massachusetts inorganic chemicals division; and **John F. Thompson,** general superintendent of inorganic division manufacturing in William G. Krummich plant, Monsanto, Ill. Also at Monsanto . . . **Dr. Ferdinand C. Meyer** becomes associate director of research in central research department of research and engineering division, while **Robert J. Schatz** is promoted to associate director of research in plastics division's Texas City laboratory.

James J. Clarke is appointed manager of newly formed industrial and military department at Winchester-Western division of Olin Mathieson.

Kenneth C. Loughlin is elected executive vice president of Celanese Corporation of America. Three new company v-p's for Celanese . . . **Ronald O. Gilbert, John W. Brooks,** and **Alexander R. Cochran.** More news from Celanese . . . **Francis S. Baer** is made a director, while **George H. Richards** is appointed senior v-p.

W. C. Lowrey is appointed manager of Shell Chemical's market development department. Also at Shell Chemical . . . **H. E. Hughes** is named new manager of Denver plant; **J. W. Hyde** becomes superintendent of Houston plant. And **F. H. Leavitt** is appointed to research post with Shell Development Company.

Theodore A. Burtis is elected president and chairman of the board at Houdry Process and also is named a director of the corporation's subsidiary, Catalytic Construction Company.



Ducon Centrifugal Air Washer TYPE WB

. . . a Ducon engineered recovery system saves thousands of dollars in wallboard production.

A leading manufacturer of wallboard experienced this problem, losing valuable profits in waste materials which escaped not only in hole drilling but during sizing, trimming, beveling and mortising operations. To combat this problem Ducon engineers recommended a special installation which provided efficient, automatic collection of waste materials and effected their return to the system for reprocessing.

Today, many of Ducon's maintenance-free Centrifugal Air Washers help transform waste into wallboard. Here is another instance in which companies achieve greater profits from production economy, aided by Ducon installations. Whatever your dust control problem, there is a Ducon unit designed to solve it.

Send today for literature on this and other Ducon efficiency-engineered dust collection equipment.

the name in dust control

THE Ducon COMPANY

Canadian Branch: THE DUCON COMPANY of CANADA, Ltd. 275 James Street North, HAMILTON, ONTARIO

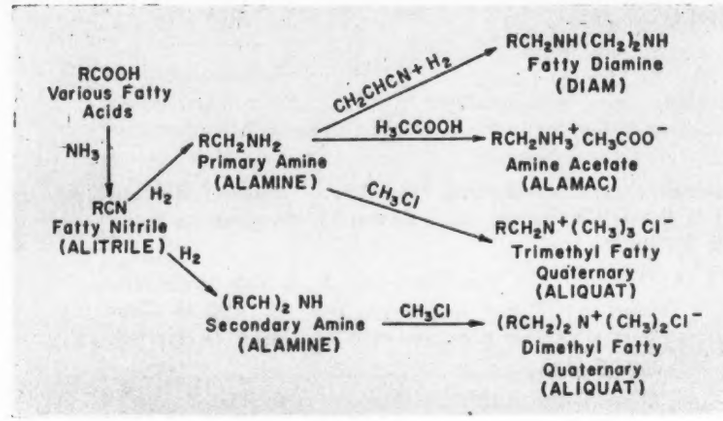
147 EAST SECOND STREET, MINEOLA, N.Y. • Sales Representatives in Principal Cities

Designers and Manufacturers of Dust Control Equipment Exclusively

CYCLONES • CENTRIFUGAL WASH COLLECTORS • TUBULAR CLOTH FILTERS • DUST VALVES

When inquiring check 1523 opposite last page

Five classes of fatty nitrogen compounds are available from fatty acids of varying molecular weight, from C_8 to C_{18}, and different degrees of unsaturation. The characteristics of the alkyl chains (R) are carried over to these compounds and through these to their derivatives thus giving a series of fatty nitrogen compounds that have —



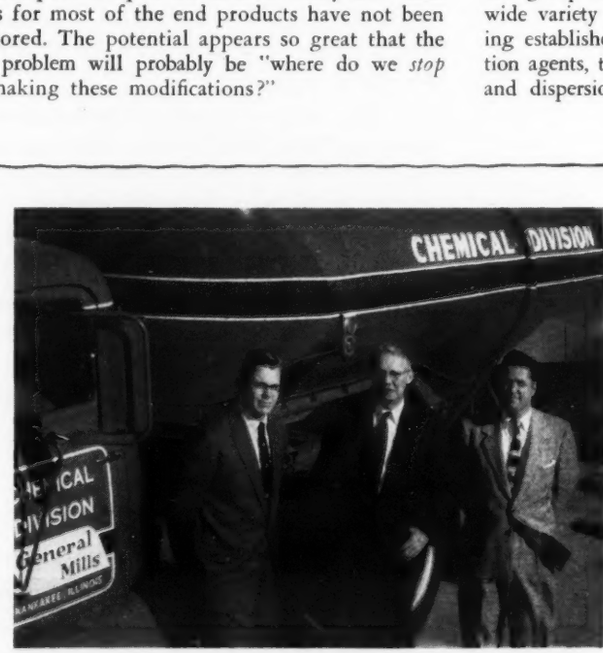
MANY REACTIONS, MANY USES

Although fatty nitrogen compounds are well-known as cationic surface-active agents for many applications, their use as chemical intermediates may not be so well known. Yet as intermediates, the compounds open the door to many new uses. Uses for most of the end products have not been explored. The potential appears so great that the big problem will probably be "where do we *stop* in making these modifications?"

The most important property of the fatty alkyl radical is its hydrophobic nature. If this radical is attached chemically to another substance, the compound acquires a hydrophobic nature. The reactive end group acts to anchor the fatty alkyl group to a wide variety of surfaces, giving rise to the following established uses: corrosion inhibitors, ore flotation agents, textile conditioners, petroleum additives, and dispersion agents.

Over two dozen fatty nitrogen compounds have recently been introduced by this company —they fall in the five classes outlined on the reaction chart.

This is a new field, and although much experimentation has been made, research is proceeding under full steam. The end products of many of the reactions have not been explored, but suggestions are given here.



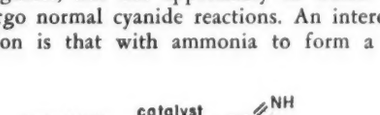
Standing beside a tank wagon of fatty amine compounds, before it leaves the Kankakee plant, are Richard B. Kron, Technical Service Manager, William F. Mitchell, General Manager of the Chemical Division, and Howard T. Von Oehsen, Manager of Sales

CP Staff Photo

Possibilities

The chemical structures of the reaction products suggest various possible end uses, such as: thioamides and substituted acetamides could be used to make such agricultural chemicals as miticides and rodent repellents. Alkoxylated amines and diamines possible could be used as water soluble non-ionic surface-active agents. The quaternary ammonium compounds from the diamines suggest uses as bactericides, germicides, and corrosion inhibitors.

Alitriles are fatty nitriles having the general formula RCN —they are of high mw and can be distilled under reduced presure. They are soluble in organics, but not appreciably in water. They undergo normal cyanide reactions. An interesting reaction is that with ammonia to form a fatty



Fatty Amidine

amidine. The nitriles will also react with H_2S to form thioamides. Substituted amides are formed by reaction with unsaturated hydrocarbons.

Alamines — primary and secondary fatty amines have similar solubility characteristics to the Alitriles, but have slightly lower respective boiling points. Primary amines can be distilled under vacuum. Secondary amines can be distilled in low-pressure-drop equipment at pressures less than 1 mm (abs.).

There are interesting reactions which should be probed for commerical uses. As the Alamines are organic-substituted ammonia derivatives, they undergo many typical ammonia reactions. Methylation with formic acid and formaldehyde gives a N,N-dimethyl alkyl amine, an intermediate for quarternaires and a catalyst for isocyanates. Reaction with ethylene oxide gives an alkoxylated amine, whose properties should

$$RCH_2NH_2 + n\left(CH_2-CH_2\right) \longrightarrow RCH_2N\begin{matrix}(CH_2CH_2O)_yH\\(CH_2CH_2O)_xH\end{matrix}$$

$(n = x+y)$ (O)

Alkoxylated Amine

make it a valuable water-soluble nonionic surface-active agent and a corrosion inhibitor. With propiolactone or methyl acrylate, substituted β-alanine and substituted hydroxy propioamide or the methyl ester of substituted β-alanine, respectively, are formed. These may serve as amphoteric surface-active agents and corrosion inhibitors.

Diams, fatty trimethylene diamines with both a primary and a secondary amine group, are dibasic and have high cationic activity. They have limited solubility in polar solvents and aliphatic hydrocarbons, but are completely soluble in most aromatics. They are insoluble in water, but will make stable dispersions in presence of a surface-active agent.

Reaction with long-chain organic acids increases their solubility in non-polar solvents and mineral oils. Corrosion inhibition is, in general, improved also. The di-salts (formed by reaction of *both* amine groups) appear that they will be the most useful. Reaction with methyl chloride and caustic gives a quaternary ammonium chloride.

$$RCH_2NH(CH_2)_2NH_2 + 5CH_3Cl + 3NaOH \longrightarrow$$

$$\left[\begin{matrix}CH_3 & & CH_3\\ | & & |\\ RN-(CH_2)_3-N-CH_3\\ | & & |\\ CH_3 & & CH_3\end{matrix}\right]^{++} 2Cl^{=} + 3NaCl + 3H_2O$$

Diquaternary Ammonium Chloride

With ethylene oxide, an alkoxylated diamine is formed.

Alamacs — primary amine acetates — are water-

(Please turn to next page)

CARBIDE AND CARBON CHEMICALS

Carbide and Carbon Chemicals Company
A Division of
Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.

NIACET vinyl acetate monomer
Trade-Mark

A large, new unit is now on stream at Texas City, Texas. This unit more than doubles existing capacity there and substantially increases national production of vinyl acetate monomer.

With this increased availability, you can count on CARBIDE to continue to meet your growing needs for vinyl acetate monomer. And you can rely on NIACET vinyl acetate monomer because it is produced by the pioneer and leader in vinyl monomers.

In Canada: Carbide Chemicals Company, Division of Union Carbide Canada Limited, Montreal.

The term "Niacet" is a registered trade-mark of Union Carbide and Carbon Corporation.

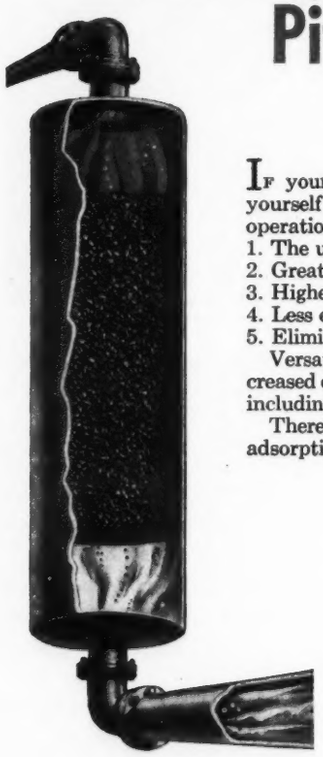
When inquiring check 1524 opposite last page

"Batch-Type" Operation is fine in the kitchen...

But for Highest Adsorption Efficiency Specify

Pittsburgh Granular Carbons

IN A CONTINUOUS COLUMN SYSTEM



If your process utilizes activated carbon in a batch-type operation, you owe it to yourself to investigate the unique benefits of converting to a continuous column operation employing Pittsburgh Granular Activated Carbons. Such a system offers:

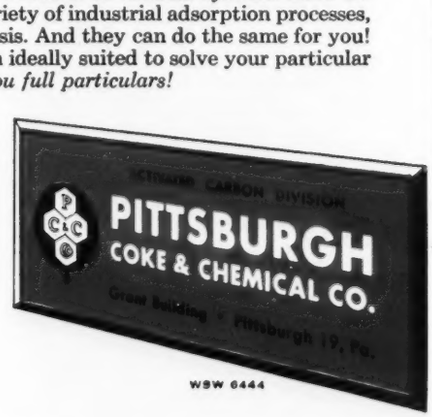
1. The ultimate in counter-current efficiency and simplicity of operation.
2. Greater capacity, lower carbon dosage, lower costs.
3. Higher product quality, better colors, higher purity.
4. Less equipment, less floor space, less maintenance required.
5. Elimination of slurrying and dusting problems inherent in powdered carbon systems.

Versatile, coal-derived Pittsburgh Granular Carbons in column systems have increased efficiency and lowered costs in a wide variety of industrial adsorption processes, including purification, decolorization and catalysis. And they can do the same for you!

There's a type of Pittsburgh Granular Carbon ideally suited to solve your particular adsorption problem. *A letter or call will bring you full particulars!*

Send for this Free Booklet

Write today for your copy of new "Pittsburgh Activated Carbons" booklet. Describes types and uses of Pittsburgh Carbons in vapor and liquid phase applications.



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When inquiring check 1525 opposite last page

Fatty Nitrogen Compounds

(*Continued from preceding page*)

soluble or dispersable, and are soluble in many organics. Above 60°C they will dehydrate, forming alkyl-substituted acetamides. Aqueous solutions have much less tendency to decompose at elevated temperatures.

Aliquats are fatty quaternaries. They are stable in both acid and alkaline media, and in presence of most water-soluble salts and in hard water. Both mono- and di-fatty Aliquats are soluble in many polar solvents. The former are water soluble, while the di-fatty Aliquats are not appreciably so, but can be dispersed.

(Fatty nitriles are products of Chemical Division, General Mills, Inc., Dept. CP, PO Box 191, Kankakee, Ill. . . . or check 1526 opposite last page.)

Roving made of glass fiber delivers more strength than mats . . .

fiber is silane-sized for maximum strength, both wet and dry

Uses: For hand lay-up of glass fiber product.

Features: Roving delivers more reinforcement strength than mat and handles easier in some lay-ups due to continuous strands and no binder-dissolving problems. All fiber is silane-sized for maximum strength in both wet and dry conditions.

Description: Glass fiber woven roving is made by weaving a straight or parallel drawn skein of roving on a conventional loom. Number of strands in skeins being woven can be varied depending on the product properties desired. Advantages and limitations of the roving places it between reinforcing mat and woven fabrics.

(Unirove is a product of Fiber Glass Div., Ferro Corp., Dept. CP, Fiber Glass Road, Nashville, Tenn. . . . or check 1527 opposite last page.

Highly detailed information on plasticizers

Twelve plasticizers described in this 68-page book offer to plastics, coatings, and rubber industries a wide choice of properties. Description, performance, and test methods are given. Six pages of conversion tables are included.

"Flexol Plasticizers—Third Edition" is issued by Carbide and Carbon Chemicals Co., a Div. of Union Carbide and Carbon Corp., Dept. CP, 30 E. 42nd St., New York 17, N.Y. When inquiring check 1528 opposite last page.

Water-based agent controls foam effectively . . .

has wide temp, pH ranges

Uses: Control of foaming and large volume aqueous solutions in pulp and paper mills.

Features: Agent is particularly effective where oil-base formulations are not effective or would result in product contamination. Foaming is controlled over a wide temp range and in pH range of 2-12. A liquid, the agent is easily and accurately pumped.

Description: Product is composed of antifoam agents in an aqueous-solvent carrier, and is believed to be the first water-based antifoam offered to industry. Pour point is 60°F and weight is 7.6 lb/gal.

Dosage is from ¼ to 2 lb/ton of fiber furnish, and can be fed as received or as a 5% solution.

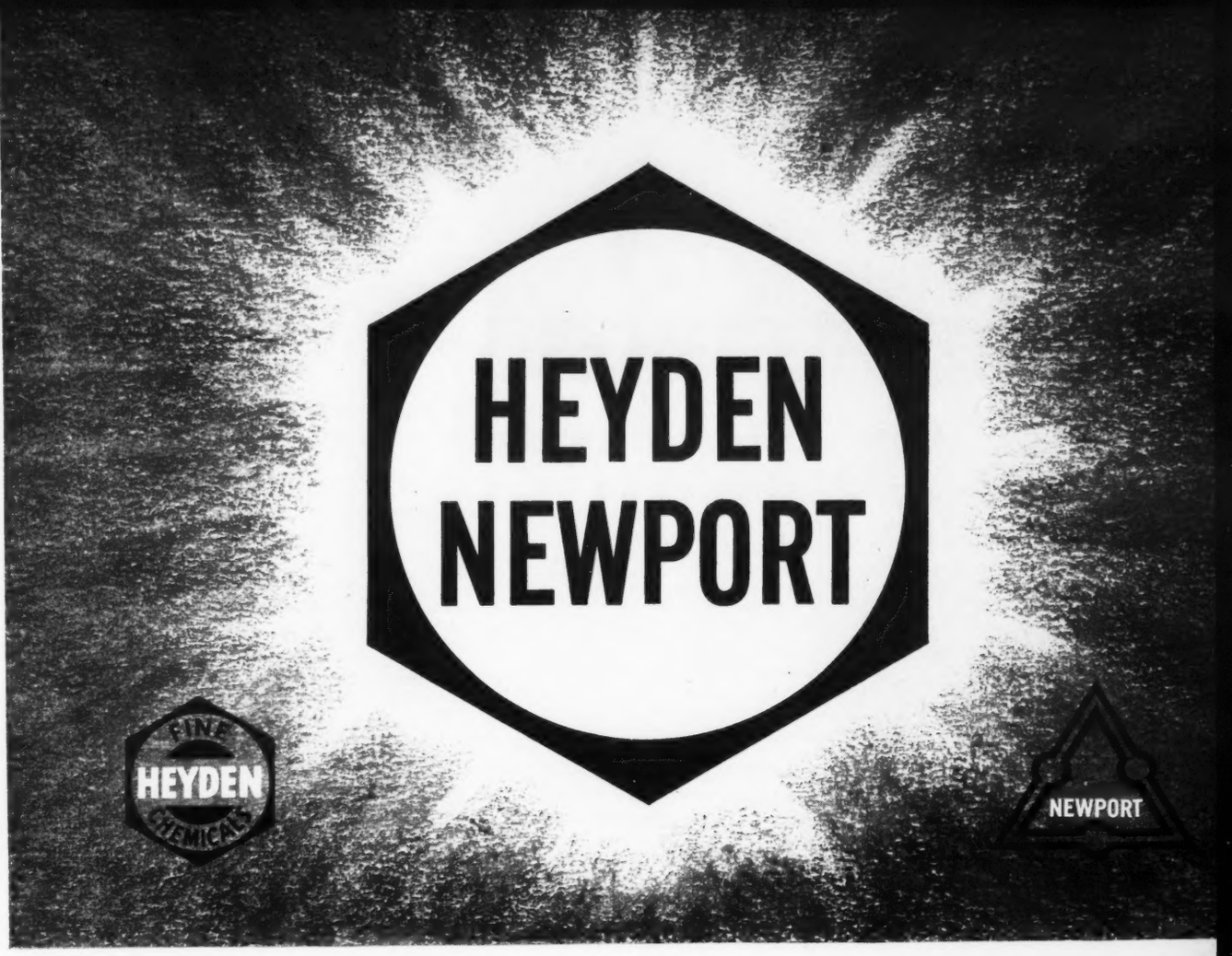
(Nalco 71-K Antifoam is a product of National Aluminate Corp., Dept. CP, 6216 W. 66th Pl., Chicago 38, Ill. . . . or for more information check 1529 on form opposite last page.)

Physical, electrical data on epoxy resins

Fold-out chart, 11″ × 21½″, gives physical and electrical data on 27 formulated epoxy resin systems. Included are room-temp set, heat-cured, filled, unfilled, resilient, and rigid resins. Properties with different hardeners are given.

Epocast Resin Chart EP-56-49 is issued by Furane Plastics, Inc., Dept. CP, 4516 Brazil Street, Los Angeles 39, Calif. When inquiring check 1530 on form opposite last page.

For more information on product at right, specify 1531 . . . see information request blank opposite last page.



Industry's newest chemical trademark

. . . a symbol of broadened service

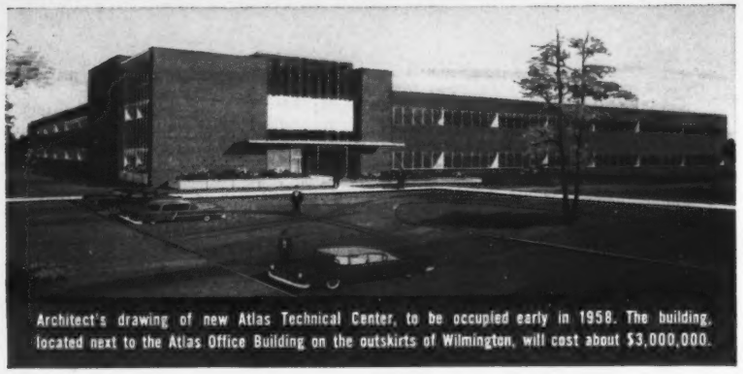
Heyden Chemical Corporation, **a leading producer of organic chemicals for over half a century—pioneer in the commercial production of such important chemicals as formaldehyde, salicylates, benzoates, pentaerythritols and many others—now combines the forces and facilities of *Newport Industries, Inc.,* a major producer of naval stores, tall oil fatty acids and rosins, and well-known manufacturer of fine chemicals derived from wood.**

The new Heyden Newport Chemical Corporation now offers industry a single dependable source of over 200 quality chemicals . . . increased distribution . . . broadened customer service and research facilities.

Look for this new trademark—it is your assurance of service, quality and dependability in the chemicals you buy.

HEYDEN NEWPORT

HEYDEN NEWPORT
CHEMICAL CORPORATION
342 Madison Avenue—New York 17, New York



Architect's drawing of new Atlas Technical Center, to be occupied early in 1958. The building, located next to the Atlas Office Building on the outskirts of Wilmington, will cost about $3,000,000.

NEW ATLAS TECHNICAL CENTER

to broaden research into chemistry of the future

This new Atlas Technical Center is the latest step in an Atlas program of growth encompassing its long-range research, as well as its applications research and customer service. Within the next three years, we plan to approximately double our research and development power. You can look to new and greater chemical developments from Atlas . . . more contributions toward the knowledge of chemical products and processes yet unknown.

The Technical Center will provide extensive facilities for research and development across the entire range of applications served by present Atlas products, including sorbitol, emulsifiers, detergents, polyester resins, activated carbons, and explosives.

For the near future, this will mean more technical help for our present-product customers on their own new products, more ways for them to cut their own research costs through working with us. For the not-too-distant time to come, we hope it will mean more and better Atlas products and services—not only for the many industries we now serve, but for an even broader list of industries and, too, for the creation of new industries.

These products and industries use Atlas chemicals

ADHESIVES	DRUGS	INKS	PHARMACEUTICALS
BREWING	DRY CLEANING	INSECTICIDES	PLASTICS
CHEMICALS	EDIBLE FATS & OILS	LUBRICANTS	POLISHES
CLEANING COMPOUNDS	ELECTROPLATING	PAINTS	RESINS
CONFECTIONS	EXPLOSIVES	PAPER	RUBBER
COSMETICS	FOODS	PERFUMES	SUGAR
CUTTING OILS	GLUE SPECIALTIES	PETROLEUM	TEXTILES
DETERGENTS	HERBICIDES	PRODUCTION	TOBACCO
			VITAMIN PRODUCTS
			WATER PURIFICATION

CHEMICALS DIVISION
ATLAS POWDER COMPANY
WILMINGTON 99, DELAWARE

In Canada: Atlas Powder Company, Canada, Ltd.
Brantford, Ontario, Canada

When inquiring check 1532 opposite last page

Finds dimethyl and anhydrous hydrazine make effective anti-skinning agents . . .

have desirable qualities for oleo-resinous coating compositions

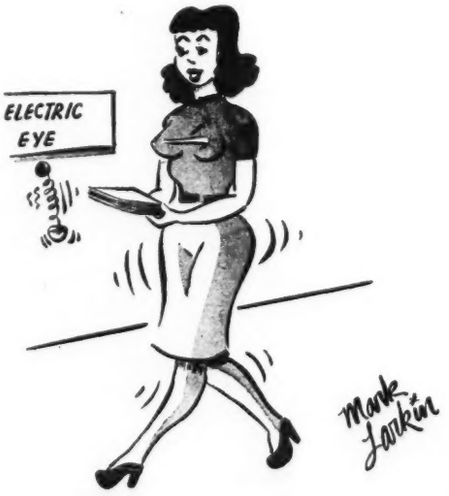
Uses: As anti-skinning agents for any oleo-resinous coating composition, such as varnishes, enamels, and paints, where formation of a skin during storage is a problem.

Features: The products are effective at low concentrations, do not react adversely with the coating composition, do not impart undesirable odors to the formulations, and do not increase drying time excessively.

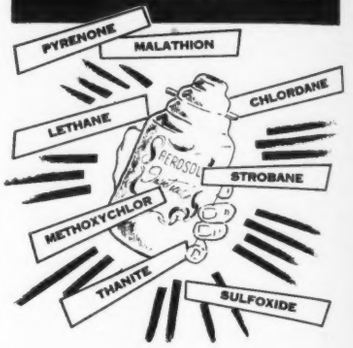
Description: Two agents are recommended: anhydrous hydrazine and dimethyl hydrazine. They are effective in concentrations one-half to one-sixth that of the use level of conventional anti-skinning agents.

Even though they require care in handling by the paint formulator, due to their flammability and toxicity, they offer little hazard in the concentrations recommended for use in coatings. Although the flash point of anh. hydrazine is 126°F, it burns at lower temperatures. Dimethyl hydrazine (DMH) requires care in handling as its flashpoint is 5°F. DMH is appreciably less toxic than hydrazine.

(Hydrazine and DMH are products of Industrial Chemicals Dept., Olin Mathieson Chemical Corp., Dept. CP, Baltimore 3, Md. . . . or for more information check 1533 opposite last page.)



FOR YOUR AEROSOL INSECTICIDE PERFORMANCE TESTED MASKING AGENTS!



One of the industrial perfumer's most frequently encountered requests today is the development of masking agents for the vast and rapidly expanding field of aerosol insecticides. Perfume bases designed for incorporation in these products must pass the most rigid tests concerning solubility in gas, container compatibility, and good coverage of the active insecticide ingredient. These highly technical, specialized procedures can only be satisfactorily resolved in an aerosol testing laboratory, such as the D&O Aerosol Department offers, under the direction of experienced perfumers and aerosol technicians. Whether your aerosol insecticide contains MALATHION, LETHANE, PYRENONE, CHLORDANE, SULFOXIDE, THANITE, METHOXYCHLOR, STROBANE, or any one of the other popular active ingredients . . . the D&O Industrial Odorant and Aerosol Testing Laboratories can provide *performance tested masking agents*, tailored both to your product and price range. Consult D&O.

WRITE FOR AEROSOL INSECTICIDE FOLDER

Essentially for You

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ESTABLISHED 1798

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U.S.I. CHEMICAL NEWS

★ A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★

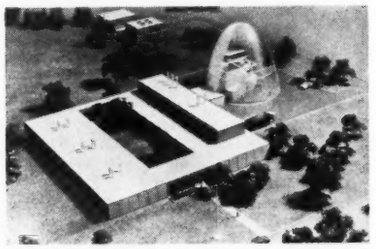
Nuclear Reactor Planned By U.S.I. and 9 Others For Industrial Research

A privately owned nuclear reactor for industrial research will be built and operated at Plainsboro, N. J. by a new company, Industrial Reactor Laboratories, Inc., formed by U.S.I. Division of National Distillers and 9 other companies.

U.S.I.'s participation in this new undertaking is one more step in its expanding research program. There are many possible avenues of research open. For example, radiation techniques provide new variations in the properties of polyethylene. The company is an important producer of polyethylene and plans to use the new reactor for the study of radiation techniques and effects on the resin.

Many chemical reactions may be energized or modified by the use of nuclear radiation.

MORE



Model of the Industrial Reactor Laboratories research reactor to be built by 10 participating companies, including U.S.I. The reactor is the dome-shaped structure while the building in the foreground will house individual laboratories of the participating companies.

Greenleaf to Handle Market Development of Zirconium And Titanium for U.S.I.

William C. Greenleaf has been named Manager of Metals Development for U.S.I. and will be responsible for market development and sales of zirconium and titanium sponge, to be produced from U.S.I.'s two new plants now being built in Ashtabula, Ohio.

A recognized authority in the field of zirconium and titanium, Mr. Greenleaf presented three papers during the 1955 Atomic Industrial Forum Zirconium Program, describing (1) melting of zirconium, (2) fabrication of zirconium, and (3) zirconium mill products and prices. He also conceived and developed processes now in general use for producing both wide-sheet and flat-bar titanium and zirconium by continuous strip-mill techniques.

Zirconium and Titanium Lick Roughest Corrosion Problems

Metals to be Available at Lower Cost in Future; Provide Long-Lived Materials of Construction; Complement Each Other on Corrosion Resistance

It is now practical to fabricate equipment which is *corrosion-resistant to almost every substance encountered in industry*, by using either zirconium or titanium metal. Alloys of either metal, or possibly both, may extend the range even further.

Steam jet made of zirconium, at left, gives trouble-free performance after a year in hydrochloric acid service. At right, throatpiece from steam jet, made of cast iron, looks like this after one week in hydrochloric acid service.

To date titanium has been used principally in aircraft construction, where its high strength-to-weight ratio offers great advantages. And zirconium has been developed primarily for atomic energy work as a strong and corrosion-resistant metal with desirable nuclear properties. The demand for titanium and zirconium created by these applications has greatly accelerated the production capacity and fabrication technology of these "new" materials of construction, making them available to the chemical industry in a short time and at a reasonable price.

Supply Increasing in 1957

Industrial applications of these metals have been hampered by two considerations: availability and price. Zirconium will shortly be produced at a rate sufficient to supply industrial needs, and titanium has been available to industry during the past two years. And it is expected that increased production of these metals during the next few years will result in significant price decreases.

MORE

Typical Corrosion Resistances* of Zirconium and Titanium

Corrosive Media	Metal Resistance	
	Zirconium	Titanium
Sulfuric Acid	excellent to good below 80%	good below 5%
Nitric Acid	excellent	excellent
Hydrochloric Acid	excellent	good below 10%
Phosphoric Acid	excellent to fair below 85%	poor
Chromic Acid	excellent	excellent to good
Aqua Regia	poor	excellent
Wet Chlorine Gas	poor	excellent
Chlorine Water	excellent	excellent
Sodium Hydroxide	good below 90%	good below 50%
Ferric Chloride	poor	excellent
Calcium Chloride	excellent	excellent
Cupric Chloride	poor	excellent
Sodium Chloride	excellent	excellent
Ammonium Chloride	excellent	excellent
Aluminum Chloride	excellent	excellent to fair

*Above data do not cover all conditions because of space limitations. Literature references may be obtained by writing the Editor, U.S.I. Chemical News, 99 Park Ave., N. Y. 16, N. Y.

U.S.I. CHEMICAL NEWS

CONTINUED

Corrosion

Twelve to thirteen thousand tons of titanium were available in 1956 and present construction schedules indicate that the figure will rise substantially in 1957. U.S.I.'s new plant alone will add 5,000 tons to the annual production capacity by the end of the year. Zirconium will be on the market in quantity by mid-1957. When its new plant at Ashtabula, Ohio gets under way, U.S.I. will be able to supply 500,000 pounds or more per year to commercial users in addition to its Atomic Energy Commission commitments of 1,000,000 pounds per year.

New Metals Economical

Chemical process equipment can now be fabricated from titanium for a little over twice the price of stainless steel, and it is expected that in the future titanium equipment will be only 50-75% higher than stainless. Commercial grade zirconium equipment will probably be priced only 75-100% higher than stainless when volume production is reached.

Several other factors combine to make zirconium and titanium economical as corrosion-resistant materials of construction. For many of the more difficult-to-handle chemicals, especially chlorides and oxidizing acids, equipment fabricated from these metals can have extremely long service life. Product contamination can be virtually eliminated in chemical and food handling processes.

Corrosion resistances of zirconium and titanium to typical chemicals are presented in the chart on page 1.

Methionine Increases Protein Utilization Of Dried Fish Meal

Supplementation of commercial fish meal with DL-methionine, an essential sulfur-containing amino acid, raises significantly the net protein utilization of the meal, according to a report recently published in England.

During the drying process, the action of heat in the presence of moisture is said to impair the protein quality of fish meal. Methionine becomes the chief limiting amino acid, and increasing the methionine content of the fish meal through supplementation restores most of the protein value of the meal.

CONTINUED

Reactor

U.S.I. plans to look into new and more efficient processes for the production of a wide variety of chemicals through research at the proposed installation.

Participation in the project will also enable U.S.I. to make further studies on materials for nuclear reactors. The company is a major producer of metallic sodium, used as a heat transfer medium for certain types of reactors.

And zirconium will be produced by U.S.I. in the near future under a contract with the Atomic Energy Commission. Zirconium is a key structural material for atomic reactors and a raw material for the production of reactor fuel elements. The company is vitally interested in developing still other materials and chemicals used in the generation of atomic power.

Faye Named Manager of Sodium Product Sales

Martin Faye has been named Manager of Sodium Product Sales for U.S.I. and will be responsible for coordinating sales and sales promotional activities for metallic sodium, "U.S.I. Isosebacic" acid and related products.

Mr. Faye joined the U.S.I.-National Distillers organization in 1952 in the Market Research and Development Department, where he was responsible for commercial development of "U.S.I. Isosebacic" acid. "U.S.I. Isosebacic" is the registered trade mark for a mixture of 10-carbon dibasic acids produced synthetically for the first time by a U.S.I.-developed process. A 10,000,000 pound-per-year plant to produce this material is under construction at U.S.I.'s Tuscola, Illinois plant site, and is expected to be in operation by mid-1957.

TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing the Editor, U.S.I. Chemical News.

Polyethylene "pillows" to retard evaporation of liquids in open tanks and vessels are now being produced. They are air-filled, 5/8" by 1¼" by ½" in size. A 1½" layer is claimed adequate for solutions at any concentration. **No. 1190**

Monomethylol dimethyl hydantoin, now produced commercially, is offered as an almost odorless donor of formaldehyde and for reaction as a substituted hydantoin. Contains 19% combined formaldehyde capable of liberation **No. 1191**

New alkaline scale and oxide remover for iron and steel is said to act electrolytically for rapid removal without chemical attack. Recommended for plating lines and automatic equipment involving alkaline solutions. **No. 1192**

A zirconium-copper alloy now available is reported to combine high electrical conductivity with good strength retention at elevated temperatures. Suggested for electrical motor commutators serving above 500°F where strength is needed. Conductivity is 95.8% of copper. **No.1193**

Fire protection for chemicals is discussed in a new 152-page book which can be purchased by those interested in the subject. Chemical hazards are analyzed, and methods of fire prevention and fire fighting are covered. **No. 1194**

A new cellulose derivative dissolves readily in cold water and is suggested for use as a thickener, emulsifier, adhesive and binder. The material is an ethyl-hydroxyethyl cellulose. Solutions are claimed to resist mold. **No. 1195**

A dye for photographic emulsions has just been synthesized which extends their sensitivity far into the infrared. Known as thiahexacarbocyanine, the dye has its absorption maximum at 1140 millimicrons. **No. 1196**

Titanium wire cloth is now on the market in sizes from 60 mesh to coarser grades. It is reported to be particularly suitable for filtering or screening highly corrosive materials. **No. 1197**

A new material for standardizing acids directly in one step is now available to laboratory workers. It is tris (hydroxymethyl)- amino-methane, reported to eliminate the usual acid vs. base, base vs. phthalate procedure. **No. 1198**

Glycerine, its commercial grades, specifications, test methods, shipping and storage requirements, is described in a 19-page booklet just issued. A 17-page booklet on properties and uses of glycerine is also available. **No. 1199**

PRODUCTS OF U.S.I.

INORGANIC CHEMICALS:

Sodium, Metallic: cast solid in tank cars, steel drums, pails; bricks in barrels, pails.
Chlorine: liquid, in tank cars.
Caustic Soda: 50% liquid, in tank cars.
Sodium Peroxide: dust-free granules, in drums
Sulfuric Acid: all strengths, 60° Baumé to 40% Oleum. Also Electrolytic grade to Federal specifications. Tank cars or tank wagons.
Ammonia: Anhydrous, commercial and refrigeration. Tank cars or tank wagons. Also Nitrogen Fertilizer Solutions.

OTHER PRODUCTS:

Alcohols: Ethyl (pure and all denatured formulas), Normal Butyl, Amyl, Fusel Oil; Proprietary Denatured Alcohol Solvents SOLOX®, FILMEX®, ANSOL® M, ANSOL® PR.

PETROTHENE® Polyethylene Resins.

Esters, Ethers and Ketones: Normal Butyl Acetate, Dibutyl Phthalate, Diethyl Carbonate, Diethyl Oxalate, Ethyl Acetate, Ethyl Ether, Acetone.

Intermediates and Fine Chemicals: Acetoacetarylides, Ethyl Acetoacetate, Ethyl Benzoylacetate, Ethyl Chloroformate, Ethylene, Ethyl Sodium Oxalacetate, Sodium Ethylate solution, Urethan USP (Ethyl Carbamate).

Animal Feed Products: Calcium Pantothenate, Choline Chloride Products, Curbay B-G® 80, Special Liquid Curbay®, DL-Methionine, Niacin USP, Riboflavin Concentrates, Vitamin B_{12} and Antibiotic Feed Supplements, Vacatone® 40, Vitamin A, D_3 and K_3 Products, Antioxidant (BHT) Products.

Pharmaceutical Products: DL-Methionine, N-Acetyl-DL-Methionine, Riboflavin USP, Urethan USP, Intermediates.

U.S.I. INDUSTRIAL CHEMICALS CO.
Division of National Distillers Products Corporation
99 Park Avenue, New York 16, N. Y.

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Trio of lignin sulfonate products, through specialized properties, offer many possibilities . . .

as binders, sequestrants, emulsifiers, flotation reagents, and in water treatment and adhesives

Uses: Members of the series of lignin sulfonates are used as binders, sequestering agents, emulsifiers, dispersants, flotation reagents, emulsion stabilizers, adhesives, and as water treating agents.

Features: Orzan P precipitates readily from solution by addition of alum, and clings to fibers. This property recommends it as a binder for fibers, retention of fines, an emulsifier and emulsion stabilizer, a flocculant, and dispersant.

Orzan A and S make good stabilizers for asphalt emulsions; binders for briquets, foundry cores, refractories, and roads; and dispersants for cleaning compounds, clay and lime slurries, dyestuffs, and insecticides. In ceramics, they are deflocculants. With carbon blacks, they make good wetting agents and dispersants. As ore flotation reagents, they are depressants and dispersants. They are dispersants and scale inhibitors for treating boiler water.

The sulfonates show promise as extenders in polyvinyl adhesives and as an ingredient and extender in phenolic resins. They act as coprecipitants in protein precipitation. In agriculture, they improve soil structure and water penetration, add organic matter and nutrients to the soil, and minimize wind erosion.

Description: There are six members of the Orzan series. Orzan P is a spray-dried lignin sulfonate powder. Orzan PL-40 is a 40% aqueous solution of Orzan P.

Orzan A is a mixture of ammonium lignin sulfonate powder and wood sugars, in about a 3.4:1 ratio. About 23.4% is alkali-liberated NH_3, ash, or not otherwise accounted for. Orzan AL-50 is the 50% solution. Molecules become larger on heating, gradually increasing viscocity of the solution until a stiff gel is formed. This also changes the properties.

Orzan S has approximately 69.2% sodium lignin sulfonate and wood sugars, in about a 5:1 ratio. About 0.9% of the solids is nitrogen, and $<0.2\%$ is displaced as ammonia by strong alkali. Orzan SL-50 is the 50% solution. Essentially neutral, solutions have low corrosion tendency.

(Orzan series are products of Chemical Products Div., Crown Zellerbach Corp., Dept. CP, Camas, Washington. Check 1535 opposite last page.)

For more information on product at left, specify 1536 . . . see information request blank opposite last page.

Dowicide preservatives prevent product breakdown

. . . protect quality in bottled products

If you examine closely the reasons for the success of a bottled product, you'll always find one important factor present: product stability. Ingredients must resist deterioration and maintain quality over long periods of time.

Dowicide® preservatives are often used to lengthen the effective life of bottled products. In liquid starches, for example, Dowicide A controls bacteria, prevents deterioration and objectionable odors.

Liquid starches are only one of many products that have been improved by using Dowicide preservatives. In the paper, ceramics, leather, adhesives, paint and building fields, Dowicide preservatives are playing equally important roles in the control of bacteria and fungus.

If your product is anything short of perfection, one of the fourteen Dowicide preservatives may possibly improve it. Let our laboratories help you choose the right one for your product. For specific information, return the coupon to us. THE DOW CHEMICAL COMPANY, Midland, Michigan.

THE DOW CHEMICAL COMPANY,
Dept. DP 400C, Midland, Michigan.

Please send me further information on the uses of Dowicide preservatives for:

NAME_____ TITLE_____ ☐ paint ☐ pulp and paper ☐ leather ☐ ceramics

FIRM_____ ADDRESS_____ ☐ adhesives ☐ cutting oils ☐ building materials

CITY_____ STATE_____ ☐ petroleum ☐ other (specify) _____

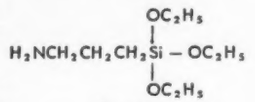
YOU CAN DEPEND ON DOW

When inquiring check 1537 opposite last page

Attaches a reactive center to terminal carbons of silicone-modifying groups

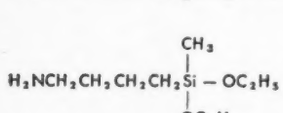
Now silicone compounds can be treated as "ordinary organics" in their reaction

Four monomeric silicones that can react easily with organic chemicals are available. Secret is in the functional groups that have been attached to conventional organosilanes, Instead of being "inert," these are reactive.



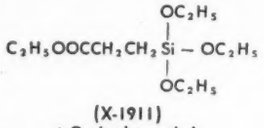
(X-1901)
γ-Aminopropyltriethoxysilane

A big advantage of silicones has been in their inertness, which is inherent in conventional non-functional modifiers such as phenyl and methyl groups. In many applications, however, this has been turned into a disadvantage because it made silicones hard to react chemically, and thus limited their vast possibilities.



(X-1902)
δ-Aminobutylmethyldiethoxysilane

Now we have a series of compounds that have reactive organic centers attached to terminal carbons of the modifying side chain. The four compounds offered here will react with just about every commercially-important organic chemical known—and by typical organic reactions. And in addition, the silane portion can also function independently. Compounds are amino- and carbethoxy-modified silane esters, with each available as the di- or triethoxysilane. The fourth compound, not illustrated here, is β-carbethoxypropylmethyl diethoxysilane, identified as X-1913. Additional compounds are under development.



(X-1911)
β-Carbethoxyethyltriethoxysilane

Potential

Big use of these chemicals will be in modifying products of specific interest to an individual chemist. Exploratory work has turned up some interesting leads on possible applications of these silanes.

With glass cloth and inorganic oxide fillers—

BRIEFS FOR BUYERS about Chlorine

Send for this new chlorine safety chart

Bring your employees up-to-date on safe chlorine handling with this new Hooker safety chart.

In concise, easy-to-understand terms, this chart lists some of the precautions to be observed in handling tank cars, cylinders, and ton containers of chlorine.

It tells some of the things to do and, equally important, some things *not* to do with chlorine.

It contains sections on first aid and emergency methods—advice that can minimize the effects of an accident should it occur.

It summarizes, in easy-to-post form, the more detailed information found in Hooker Bulletin 125.

Main purpose of the chart is to help *prevent* accidents through a complete knowledge of chlorine itself and the containers it's shipped in.

Mail the coupon for a copy.

New caustic soda drum empties faster

Whether your operators scoop, pour, or shovel flake caustic soda from drums, they'll find our new drums easier, faster, and safer to work with.

The lids on these drums have been increased from 14 to 18 inches in diameter—an increase of 65% in opening area.

You pay no extra for this new drum. So, if you've been paying a premium to get caustic soda in full open-head drums, you can now get many of the advantages af the larger opening at standard prices.

You can order the new drum filled with your choice of four forms—*Regular, Fine,* and *Crystal* flakes, or *Granular.*

Barge delivery of caustic soda might save you money too

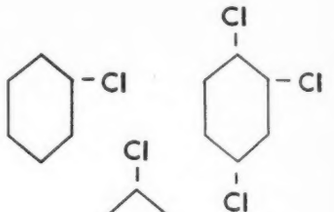
Nearby navigable water could make a big difference in the amount you spend on heavy chemicals next year.

Some of our customers save up to tens of thousands of dollars a year because they can receive more cheaply by barge.

The single barge shown here, for example, is on its way to a pulp mill with 11 tank cars of chemicals above deck and 1,000 tons of Hooker liquid caustic soda below.

Your Hooker salesman can help you find out if you can save by receiving caustic soda or other chemicals from one of our plants or stock points by barge.

For other tips on buying caustic soda economically, send for the *Caustic Soda Buyer's Guide,* a 16-page booklet of facts on forms and grades, shipping methods, the economics of 50% vs. 73% liquid, and other topics of interest to buyers.



Chlorobenzenes . . . a specialty at Hooker

Whether you use chlorobenzenes as solvents or intermediates, you're sure of finding exactly the right formula at Hooker.

Currently we are making these five chlorobenzenes as well as dozens of other chlorinated organics and inorganics:

Monochlorobenzene. Liquid used as solvent and intermediate. Typically 99.5% pure monochlorobenzene as determined by cryoscopic methods.

ortho-Dichlorobenzene, Technical. Liquid used as solvent and intermediate. 85% to 87% pure ortho. Major impurity is para-dichlorobenzene.

para-Dichlorobenzene. Solid, usually used as intermediate. 100% pure. Available in 7 mesh sizes.

Trichlorobenzene, Technical. Liquid, usually used as solvent. Mixture of 1, 2, 4- and 1, 2, 3-trichlorobenzene with 1, 2, 4- predominating.

1, 2, 4, 5-Tetrachlorobenzene. Solid, usually used as intermediate. 65.7% chlorine.

For more information on any of

Caustic Soda • Muriatic Acid • Lauryl Chloride
Chlorobenzenes • Sodium Sulfide

these chemicals, you can get data sheets listing physical and chemical properties by sending us the coupon.

Note on Lauryl Chloride to careful buyers

You can afford to be fussy about the lauryl chloride you buy, if you get it from Hooker.

Here, you have your choice of *two* grades:

The *Technical Grade* satisfies most normal requirements. It has a minimum of 15.5% chlorine. Its specific gravity is 0.862± .003 at 25°/15.5°C.

If your process calls for a chemical with even better credentials, we offer you a *Refined Grade*. Minimum chlorine content is stepped up to 16.0%. Specific gravity is 0.863± .002 at 25°/15.5°C.

Both grades are a mixture of n-alkyl chlorides ranging from C_{10} to C_{18}. The C_{12} fraction predominates, accounting for about 60 to 65% of the product.

For a complete breakdown on the physical and chemical properties of both grades, send us the coupon.

Our muriatic acid is purer than Simon Pure

The origin of our phrase "Simon Pure" is a Quaker gentleman by that name who is a leading character in a play written some 200 years ago.

As a human he consists of about .004% iron.

Hooker White Grade Muriatic Acid is only .0001% iron. Even our Commercial Grade is a mere .0005% iron. Hence the claim we make above. "Simon Pure" isn't a good enough phrase for our muriatic acid.

Fact is, our White Grade is most likely the purest muriatic acid you can get anywhere in volume.

It contains .003% or less of sulfates. It has absolutely no free chlorine or arsenic, and has a mere .0002% of organic matter.

For requirements only a little less stiff, we recommend the Commercial Grade: sulfates, .003%; organic matter, .001%; chlorine, a slight trace; arsenic, none.

For the rest of the story, send for our technical data sheet— which, by the way, contains a handy guide for figuring the amount of muriatic acid you need for different volumes of various Baumé solutions.

The 1/64" answer to a sulfide problem

Let a little air get to your sodium sulfide and it saps the sulfide's strength.

Let a little iron at it and you may have serious processing problems.

The same is true of other foreign matter.

To help you avoid such problems, we take special care in the packaging of our sodium sulfide.

First, we take a brand new steel drum (we never re-use a drum). The drum has a 1/64" lining of a special lacquer to prevent iron pickup from the drum itself.

After filling, we spread a coat of lacquer over the top of the drum. The lacquer, with the help of six sturdy lugs, forms an airtight seal that holds until you break the drum open for processing. The lugs help you make a tight re-seal should you use only part of the contents.

The sodium sulfide going into the drum has a maximum of 8 ppm of iron. We get this close control by using only our own caustic soda and hydrogen and by using equipment of the most suitable alloys at every step when we make sodium sulfide.

You get Hooker Sodium Sulfide as a solid or fast-dissolving flakes. You can get a descriptive technical data sheet by clipping the coupon.

HOOKER ELECTROCHEMICAL COMPANY
502 FORTY-SEVENTH STREET, NIAGARA FALLS, N. Y.
Niagara Falls • Tacoma • Montague, Mich. • New York • Chicago • Los Angeles

HOOKER CHEMICALS PLASTICS

6-1270

For more information on chemicals mentioned here, check below:

- ☐ Chlorine Safety Chart
- ☐ Caustic Soda Buyer's Guide
- ☐ Caustic Soda, technical data sheets

Chlorobenzenes (Check which):

- ☐ Mono- ☐ ortho-Di- ☐ para-Di-
- ☐ Tri- ☐ 1, 2, 4, 5-Tetra-
- ☐ Lauryl Chloride
- ☐ Muriatic Acid
- ☐ Sodium Sulfide

Is your file up-to-date on these other Hooker products? Check for technical data:

- ☐ Cyclohexanol
- ☐ Methyl Cyclohexanol
- ☐ Lauryl Mercaptan
- ☐ Sodium Tetrasulfide
- ☐ Sulfuryl Chloride
- ☐ Thionyl Chloride

Clip and mail to us with your name, title, company address. When requesting samples, please use business letterhead to help speed delivery.

When inquiring check 1538 opposite last page

Treating glass cloth with silane X-1901 improves properties of laminates with melamine, phenolic, and epoxy resin systems. Silane X-1911 is a posible dispersant coating for clay, mica, or other fillers. Coated inorganic oxide fillers in plastic and resin systems give superior bonding between the filler and resin.

Pharmaceuticals—The use of silanes in pharmaceuticals is "wide open." There's considerable interest in reactions of the amino-modified ethoxy silanes with organics that are known to have biological activity, such as sulfonyl chloride or penicillin.

Pesticides—The amino group of both X-1901 and X-1902 compounds provides a link in making pesticides. Reaction with biologically-active compounds should yield pesticides of greater durability, as the silanes should impart water resistance and insolubility upon hydrolysis to these products.

Cosmetics—Silane X-1911, and its hydrolysis product are novel intermediates for incorporation of silicones into cosmetics and toiletries, instead of merely mixing in a silicone.

Synthetic resins—These silanes have been chemically incorporated with the important resin polymers: polyamide, polyurethan and epoxy resin systems. Important property modifications are being found from this research.

Others—Other possibilities are in modification of lubricants, greases, emulsifiers, antistatic agents, sizers, and flame-retardants.

Toxicological properties have not been fully investigated. However, contact of the skin and eyes with the liquid and inhalation of the vapor, should be avoided, especially with the amino-modified silanes.

(Organofunctional silanes are available in pilot-plant quantities from Silicones Div., Union Carbide & Carbon Corp., Dept. CP, 420 Lexington Ave., New York 17, N.Y. . . . or check 1539 opposite last page.)

Reports on injection molding of high-melting resins

Injection molding applications of high-melting resins are detailed in eight-page report. General characteristics, along with drying, molds and gating, molding temperatures, ram operation, purging, and molded properties are thoroughly discussed.

Tech Report CY3 is issued by Marbon Chemical, Division of Borg-Warner Corporation, Dept. CP, 7165 Chicago Ave., Gary, Ind. Specify 1540 opp. last page.

GLC Nerofil

this new carbon-based filteraid has definite advantages for **89 caustic producing plants**

These are the plants producing caustic by the electrolytic or diaphragm method, who have had trouble with previously available filteraids . . . the silica solubility of diatomite was undesirable, and cellulose filteraids were high in price and broke down under high temperatures.

NEROFIL is already serving a number of these plants with entire satisfaction. Being pure carbon, there is no solubility, even at elevated temperatures in 50% caustic. Being a truly processed filteraid, not just crushed carbon, it produces excellent clarity, and gives flowrates equal to many grades of diatomite. Filter cake density is low, and cake porosity is high, making NEROFIL the first really satisfactory filteraid for strongly alkaline solutions.

Great Lakes Carbon Corporation

Nerofil Department – 612 So. Flower St., Los Angeles 17, California or Dept. LTK – 333 No. Michigan Ave., Chicago 1, Illinois

For complete information on the characteristics and application of the new filteraid, fill out the coupon and mail it today.

NEROFIL DEPARTMENT, Great Lakes Carbon Corporation
612 So. Flower St., Los Angeles 17, California

Name_____

Position_____

Company_____

City_____ Zone____ State_____

When inquiring check 1541 opposite last page

Starting materials for current molybdenum chemical uses

Information to aid industrial users in selecting the most economical and convenient starting materials for current molybdenum chemical applications is presented in four-page bulletin. Over 50 developmental molybdenum chemicals manufactured for research purposes are named. List of available technical bulletins on uses and properties of these chemicals is included.

Bul Ch-27 is issued by Climax Molybdenum Company, Dept. CP, 500 Fifth Ave., New York 36, New York. When inquiring specify 1542 opposite last page.

Latex paint emulsion technology can be successfully applied to paper coatings . . .

many of same ingredients can be used, along with same processing units

Recent technical paper discusses technology that has developed with the phenomenal growth of water-dispersed paints and tells how it can be successfully applied to paper coatings. Paper discusses three main topics: 1) emulsion polymers, 2) components of coatings, and 3) dispersion equipment. With some variations, same components and equipment can be used for both emulsion paints and paper coatings.

Latices originally available for emulsion paints, based on *copolymers of styrene and butadiene,* have a number of outstanding properties. Later *butadiene-acrylonitrile copolymers,* generally known as nitrile latices, were developed. Another chemical type used in emulsion paints is the *vinyl acetates,* which usually require plasticization.

Another chemical group, *polyvinyl chloride and polyvinyl chloride copolymer latices,* generally require some plasticizer and fusion at elevated temperatures to develop optimum physical properties. Another family, the *polyacrylic* group of resin-emulsions, is used in specialty applications requiring outstanding light stability. One more, *vinylidene chloride-acrylonitrile* latices, contributes high chemical resistance and low moisture vapor transmission.

In comparing a typical formulation of a latex paint with one for a paper coating, using styrene-butadiene latex, nearly all the ingredients used in one may be used in the other. Soya lecithin, not in paper coatings, is generally used in latex paint to inpart additional wetting and suspending properties to pigment. In paper coatings, a substantial portion of the binder can be alpha protein or casein. These materials are not suitable in other than small amounts in latex paints because of their poor water resistance. Of course, successful compounding of either type de-

pends on order of addition of components and processing methods.

In the plant process, certain equipment is more suitable for preparing pigment dispersions than for manufacturing stable emulsions. It has been the experience of the authors that mixing and homogenizing can be accomplished in one operation with any of the following units: 1) homogenizer, 2) Cowles dissolver, or 3) Kinetic Dispersion mill. Use of any one of these units offers the advantage of eliminating the premixing of emulsion components in one piece of equipment and homogenizing in another unit.

(Condensed from technical paper, "Latex Emulsion Paint Technology Applied to Paper Coatings," by J.P. Talley, J.P. Davis, and R.E. Benton, Chemical Materials Development Dept., Goodyear Tire & Rubber Co. Paper was presented at the Seventh Annual TAPPI Coatings Conference in Philadelphia. It was published in the October 1956 issue of "Tappi," pages 160A-163A.)

(For more information on latices for emulsion coatings contact The Goodyear Tire & Rubber Co., Dept. CP, Akron 16, Ohio. Check 1543 opp. last page.)

WANTED:

BUDDING

CARTOONISTS!

CHEMICAL PROCESSING is in the market for cartoons (and cartoon ideas). They should touch on some aspect of chemical plant or lab work.

Worth $10—Cartoons in black ink on 8½ x 11" sheets—ready to reproduce—will be bought for $10, paid on acceptance.

Worth $5—Cartoon *ideas* . . . a written description or rough sketch of scene, and a caption . . . worth $5, on acceptance.

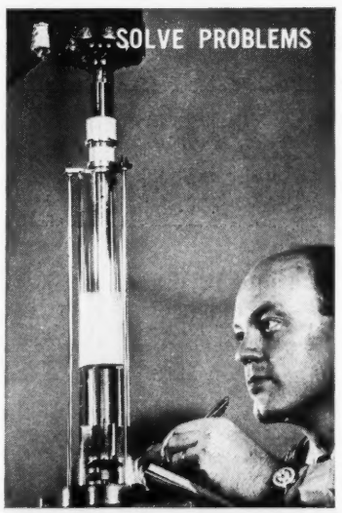
Send your gag material to:

Cartoon Editor, CHEMICAL PROCESSING
111 East Delaware Place
Chicago 11, Illinois

Be sure to include your name, position, company, and address.

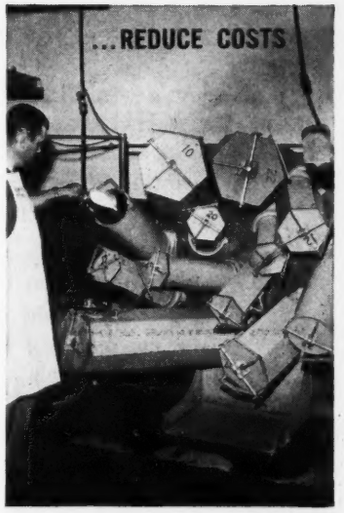
HOW *HERCULES* HELPS...

SCHOLARSHIP WINNERS—Six national winners in the 4-H Entomology Program are pictured with Hercules Vice President Paul Mayfield. Hercules sponsors this program each year to promote a better understanding of insect life and its relation to health and national wealth. Awards include 6 college scholarships, state and county prizes.



FOAM CONTROL is important in many industries, including paper making. To assist in solving problems, Hercules developed this foam tester, which can be used in mills to determine which of the many Hercules defoamers best fits the exact requirements of the mill.

TUMBLING COMPOUNDS play a key role in precision barrel finishing of metal parts. Metal cleaners based on Hercules® CMC are used in tumbling compounds to improve quality and lower cost. This is just one example of the usefulness of CMC—the versatile film-former, suspending agent, water binder and viscosity control agent.



HERCULES
CHEMICAL MATERIALS FOR INDUSTRY

HERCULES POWDER COMPANY
INCORPORATED
940 Market St., Wilmington 99, Del.

G57-1

SYNTHETIC RESINS, CELLULOSE PRODUCTS, CHEMICAL COTTON, TERPENE CHEMICALS, ROSIN AND ROSIN DERIVATIVES, CHLORINATED PRODUCTS, OXYCHEMICALS, EXPLOSIVES, AND OTHER CHEMICAL PROCESSING MATERIALS

When inquiring check 1544 opposite last page

multi multi multi multi multi multi multi multi multi

Product with a purpose...

LITHIUM Hydroxide Monohydrate

★ ADDITIVE ★ ABSORBENT ★ THICKENER ★ BOOSTER
★ EMULSIFIER ★ STABILIZER ★ SUBSTITUTE ★ CATALYST

USES for $LiOH.H_2O$ are many. Do these suggest a new use to you?

As an **additive:** Rubber treated with the stearate of lithium provides internal and external lubrication and a low coefficient of friction.

As an **emulsifier:** In the manufacture of porous concrete, $LiOH.H_2O$ is used as an emulsifying agent.

As an **absorbent:** In anhydrous form it's the most efficient solid material known for the absorption of carbon dioxide.

As a **stabilizer:** Silica sols stabilized with $LiOH.H_2O$ are used for the catalytic preparation and treatment of leather, paper and textiles, and the preparation of phosphors and phosphor adhesives.

As a **thickener:** Grease, soap and wax-makers rely on $LiOH.H_2O$ as a gelling agent.

As a **substitute:** As a substitute $LiOH.H_2O$ is used in pharmaceutical and chemical manufacturing where the use of lithium carbonate is not feasible.

As a **booster:** It's indispensable in the electrolyte fluid of alkaline storage batteries where it greatly increases battery capacity and efficiency.

As a **catalyst:** In the preparation of alkyd resins it's a preferred polymerization catalyst, and a highly active catalyst in esterification reactions.

Why don't *you* look into the versatility of lithium hydroxide monohydrate? Our PR&D department has product data and samples for the asking.

... trends ahead in industrial applications for lithium

LITHIUM CORPORATION OF AMERICA, INC.
2535 RAND TOWER, MINNEAPOLIS 2, MINN.

PROCESSORS OF LITHIUM METAL • METAL DISPERSIONS • METAL DERIVATIVES: Amide • Hydride • Nitride • SALTS: Bromide • Carbonate • Chloride • Hydroxide • SPECIAL COMPOUNDS: Aluminate • Borate • Borosilicate • Cobaltite • Manganite • Molybdate • Silicate • Titanate • Zirconate • Zirconium Silicate • BRANCH SALES OFFICES: New York • Pittsburgh • Chicago • MINES: Keystone, Custer, Hill City, South Dakota • Bessemer City, North Carolina • Cat Lake, Manitoba • Amos Area, Quebec • PLANTS: St. Louis Park, Minnesota • Bessemer City, North Carolina • RESEARCH LABORATORY: St. Louis Park, Minn.

When inquiring check 1545 opposite last page

Potassium nitrate — long the base for gunpowder and fireworks — is of increasing importance in other industrial applications as this in which it —

imparts desirable ch
to porcelain en

Material serves as oxidizing agent in smelter, acts as flux, softens batch, and in lead-bearing frit prevents oxide from being decomposed

Although not as much potassium nitrate (saltpeter) is used in the manufacture of fireworks as formerly — due to state and municipal restrictions — increasing quantities of the versatile chemical are being used in other industrial applications. One is the use of potassium nitrate at Pemco Corporation, pioneer producer of porcelain enamel frits.

At Pemco, from 27 to 100 lb of potassium nitrate is used in a batch of porcelain enamel frit

characteristics enamel

GORDON WEYERMULLER, Associate Editor
With **F. CHAPMAN,** Quality Control Manager
Pemco Corporation, Baltimore, Md.

Typical formulation for a 1800-lb batch of porcelain enamel requires 27 to 100 lb of 99.0% pure KNO_3. Principal role of potassium nitrate is to act as an oxidizing agent during the smelting at 2200°F — to take care of the reducing atmosphere which may exist in the smelter. For example, it acts as an oxidizing agent in lead-bearing frit, thus

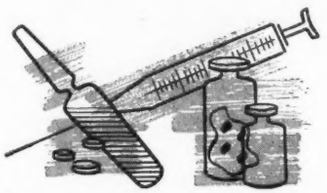
(Please turn to next page)

Which New CO_2 Application Will Help You Most?

"CO_2 applications are unlimited"... a broad statement, but literally true. New ways in which this most versatile of all gases is improving products, cutting costs and saving time and labor are being developed almost daily. Some of the applications discussed here will be of direct, primary interest to you. Other uses, while perhaps not in your immediate specialty, may well be *adaptable* to your field. Check the box by each application on which you'd like detailed, technical data and mail this page to:

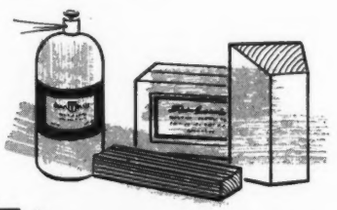
The Liquid Carbonic Corporation • CO_2 Division
3100 South Kedzie Avenue • Chicago 23

Your inquiry will receive prompt, professional attention from the chemical applications staff of the world's largest producer of CO_2.

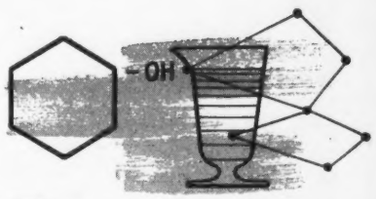


☐ ▶ **Economical, Efficient "Freeze-Drying"**—Freeze-drying is used to dehydrate heat sensitive substances at low temperatures. In the processing of blood plasma and the manufacture of penicillin, streptomycin and other pharmaceuticals, dry ice or liquid CO_2 is used to freeze the item being dried. Also, during the drying stage, dry ice is used to condense the moisture as it is sublimed under vacuum. Capable of quickly attaining and maintaining the extreme low temperatures required, CO_2 has the added advantage of requiring only a small capital outlay.

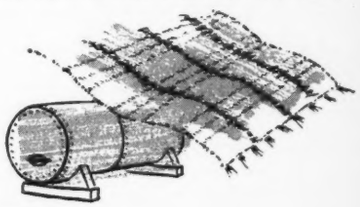
☐ ▶ **Precipitation of Carbonates**—Carbon dioxide in its gaseous form is used to precipitate carbonates from water solutions. Ammonium bicarbonate and lead carbonate are examples. Bakeries and plastics manufacturers are among the many users of ammonium bicarbonate.



☐ ▶ **Simplifies Pulverizing of Materials With Low Melting Point**—Many substances tend to melt or smear because of the heat generated in a milling process. DDT and vegetable fat flakes which are waxy and Teflon resin which is very tough and elastic are examples. In the low temperature pulverizing process the ingredient is mixed with crushed dry ice or low pressure carbon dioxide liquid is injected directly into the ingredient. These methods effectively inhibit the melting or smearing, prevents plugging and reduces horse power requirements. Gaseous carbon dioxide is also used to form an atmospheric "blanket" to effectively prevent fire during the grinding of flammable materials. An example of this application is the grinding of phosphorus pentasulphide and flammable resin materials.



☐ ▶ **Fireproof "Blanket" For Stored Phenol**—Phenol is a toxic, corrosive, flammable compound and is stored in an inert atmosphere under slight pressure to reduce vaporization, prevent oxidation and at the same time provide a non-flammable atmosphere. Carbon dioxide is also used as a pressure medium in transferring liquid phenol.



☐ ▶ **Effective Inerting Agent**—There are many times when an inert atmosphere is needed to prevent fire or explosion. Before welding a tank that has been used for the storage of flammable liquid, CO_2 is used to inert the atmosphere in the tank so that welding can be done with no danger of explosion. CO_2, acting as an effective atmospheric "blanket," also prevents oxidation and "skinning" of paints and oils.

SEND IN THIS PAGE FOR COMPLETE INFORMATION

Check off the applications which interest you, fill in the mailing information below, and mail this page to The Liquid Carbonic Corporation for prompt information. You'll also receive a free copy of our Booklet "Applications Unlimited," which covers dozens of other important uses for CO_2.

World's Largest Producer of CO_2
THE LIQUID CARBONIC CORPORATION
3100 South Kedzie Avenue Chicago 23, Illinois

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CITY_____ ZONE____ STATE_____

When inquiring check 1546 opposite last page

Potassium Nitrate

(*Continued from preceding page*)

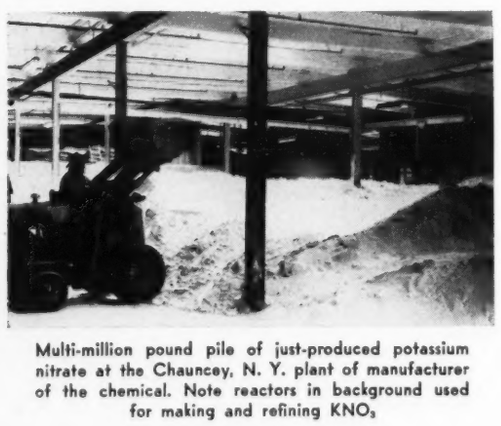
Frit comes from continuous smelter operating at 2200°F. Visual check with instruments is used with automatic controls, to insure product uniformity

preventing the reduction of the lead in the batch. Potassium nitrate also acts as a flux.

Since potassium is required for certain desirable characteristics in some types of porcelain enamel, addition of potassium as the nitrate fulfills this need. Use of the nitrate has been found to be the most economical method to accomplish the desired end results while maintaining the high quality of the porcelain enamel.

Pemco Corporation is the country's oldest manufacturer of porcelain enamel frits and the world's largest manufacturer of ceramic glaze frits. Many of their products utilize potassium nitrate as a smelting ingredient.

Although use of potassium nitrate in fireworks has declined, tonnage consumption of the chemical is still largest in this field of pyrotechnics, gunpowder, and matches. Second largest use is in



Multi-million pound pile of just-produced potassium nitrate at the Chauncey, N. Y. plant of manufacturer of the chemical. Note reactors in background used for making and refining KNO_3

What have these "warriors' shields" got to do with better product performance?

Among the hundreds of different types of particles found in Celite diatomaceous earth are these "warriors' shields." Shown here magnified hundreds of times, are, from left to right, *Navicula splendida, Raphoneis amphiceros* and *Navicula lyra.*

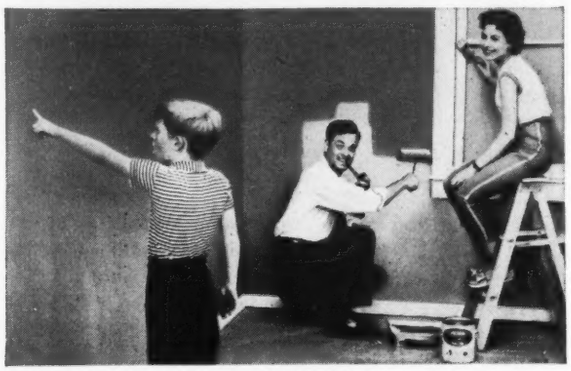
They're particles of CELITE that adds strength-

Celite's unique diatomite structure is shown in this photomicrograph. The infinite variety of particle shapes and sizes gives Celite its exceptional performance characteristics in a wide range of process applications.

Johns-Manville CELITE

Helps polish-cleaners soak up dirt. Celite's highly porous diatomite structure soaks up and retains dirt and grease . . . provides easier "wipe-off" of polish-cleaners. This same structure gives these products a mild, non-scratching abrasive action.

Adds strength to molded plastics. The harder grades of Celite impart high impact strength to many plastic products. Celite fillers also provide a more attractive surface finish and greater resistance to heat and moisture.



Controls gloss in paints. When included in paint formulations, irregular Celite particles protrude through the surface, diffusing light and providing a highly desirable flat appearance. Celite's high oil absorption also provides viscosity control for the finishes industry.

-the diatomite mineral filler soaks up dirt–controls gloss

THE structure of the individual diatom particle is the key to the success achieved by Celite* diatomite in so many process applications.

It requires 40 million whole or fragmentary particles to form a cubic inch of crude Celite. Consequently, even when added in small proportions, their properties are greatly magnified and widely dispersed throughout a formulation.

Relatively hard and irregularly shaped, particle contact is mainly limited to protruding outer points. Therefore, Celite won't pack down and has an extremely low apparent bulk density of 10 lb/cu ft. This explains Celite's high bulking action, excellent suspendability, and large particle surface area.

This same limited particle contact means that 93% of a given volume of Celite is composed of air pockets or voids. And, since the particles themselves are porous and cellular in structure, Celite can absorb more than twice its weight of liquid before reaching its limit.

Celite is produced from the world's purest source of commercially available diatomaceous silica at Lompoc, California. Celite comes in a wide range of grades . . . each carefully controlled for complete uniformity.

Ask your nearest J-M Celite engineer to tell you how Celite can help solve your formulation problems.

He's backed by Johns-Manville's extensive research facilities and years of practical diatomite experience. Call him today or write Johns-Manville, Box 14, New York 16, New York. In Canada, write Port Credit, Ontario.

*Celite is Johns-Manville's registered trade mark for its diatomaceous silica products.

Industry's most versatile MINERAL FILLERS

JOHNS-MANVILLE JM PRODUCTS

When inquiring check 1547 opposite last page

porcelain enamels and pottery glazes. The chemical is also found in mixed fertilizers and lubricating oils. It is used as a heat-transfer agent and base for metal-treating salts, and as a color improver in the manufacture of special glasses. Other uses are in cigarettes to improve burning, pickling of meats, detinning of metals, and welding compounds.

(Potassium nitrate is product of Stauffer Chemical Co., Dept. CP, 380 Madison Ave., New York 17, N. Y. When inquiring about manufacturer's product check 1548 on convenient Readers Service slip which is located opposite last page.)

High purity, high density molybdenum comes as pellets for manufacture of critical, high-temp alloys . . .

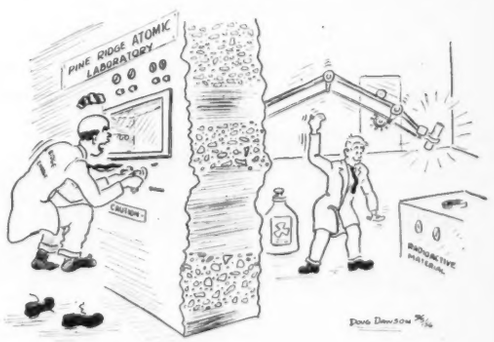
inexpensive, uniform for vacuum melting

Uses: Designed specifically for vacuum melting processes used in manufacture of critical high-temperature alloys.

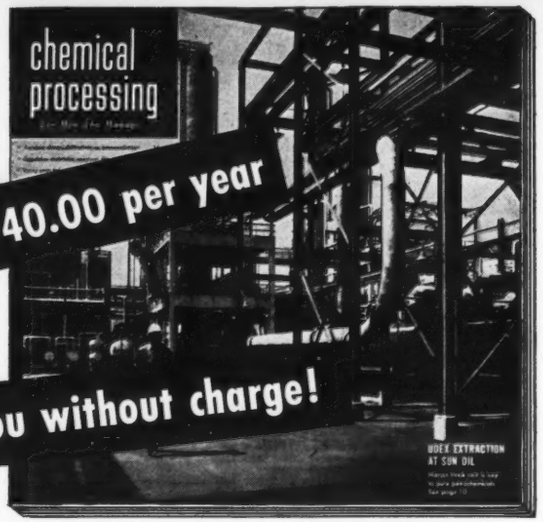
Features: High-purity, high-density pellets meet need for inexpensive, highly uniform molybdenum in vacuum melting.

Description: Molybdenum pellets are approximately 1" in diameter by ½" high. They are about 99.85% pure molybdenum, with a density of 7.0 gm/cc, and a gas content in the range of 300 ppm. Standard package contains 80 lb at $4.00 per lb.

(Molybdenum pellets are available from Tungsten and Chemical Div., Sylvania Electric Products Inc., Dept. CP, Towanda, Pa. . . . or for more information check 1549 on form opposite last page.



Cartoonist Doug Dawson works for the Technical Products Div., Corning Glass Works, Corning, N. Y.



This magazine costs more than $40.00 per year

...yet comes to you without charge!

Why? Maybe, like many others, you've wondered why CHEMICAL PROCESSING comes to you *without charge* — while, perhaps, you pay a subscription price for other business magazines.

Maybe you've thought publishers *make money* when they sell you a $3.00 or a $5.00 subscription.

No—publishers lose money . . . yes, most business magazines lose money when they sell a subscription — not only because the magazine costs more to produce than the subscription price brings in — but also because the cost of making such sales exceeds the income for $3.00 or $5.00 subscriptions.

Advertisers pay the bills — You see, it's the money that comes from advertising that keeps the business magazine publisher in business. So, logically, such advertisers *demand* best possible coverage of folks like you—the important key men who exercise buying power.

So—CHEMICAL PROCESSING "hand-picks" best readers . . . and sends the magazine to these key folks, without charge.

For you simply can't get maximum coverage of these important folks by trying to sell subscriptions. These men, limited in numbers, are scattered all over the U.S.A.: travel and/or direct mail cost money; a large share "forget to renew" each year; and, no matter how much time, money and pressure you put on them, there are always some important men who will never buy.

CHEMICAL PROCESSING gets best circulation . . . So, as you can see, to get the best, most effective circulation coverage, the best way is to "hand-pick" the right readers, then send the magazine to them. This gives value to advertisers which can't be gotten in any other way.

That's why . . . CHEMICAL PROCESSING "hand-picks" only qualified readers . . . Men Who Manage chemical processing plants . . . presidents, partners, plant managers, foremen, engineers, chemists, directors of research, etc. Then the editors make the magazine so interesting, so valuable, these folks want to read it.*

That's why CHEMICAL PROCESSING spends many thousands of dollars on each issue — to give you this valuable service costing more than $40.00 per year, per reader. That's why CHEMICAL PROCESSING comes to you without charge—*you are an important reader in the chemical field.*

**Every issue proves this qualified readership . . . by unequalled response from these key readers. May we show you the evidence?*

Chemical Processing

published by Putman Publishing Company

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"Executive Magazines for Industry"

CHEMICAL MATERIALS

Fire hazard eliminated when you print vinyl with water-base ink . . .

inks meet performance specs of solvent inks, offer many plus values

Uses: For printing and finishing vinyl sheeting and coated fabric.

Features: The big advantage is the elimination of fire hazard due to solvent vapors. Explosion-proof equipment is not needed, and rubber rolls are not attacked. Inks meet the same physical performance specs as solvent-type inks, but they are higher in solids and do not rewet. Solvent costs are reduced, cleanup is made easy, and there is less drying-in which minimizes streaks and scratches.

Description: Water-base pigment concentrates and clears may be blended to give all the colors of the rainbow, and in optimum strengths. They dry in one min at 140°F, print at normal speeds.

Water inks do not depend on solvent bite, as they develop a true adhesion to the vinyl film after the water has evaporated. It is similar to the way an organic coating develops adhesion to an impervious substrate such as metal or glass.

(IC Aquavin inks are products of Finishes Div., Interchemical Corp., Dept. CP, 224 McWhorter St., Newark, N. J. Check 1550 opposite last page.)

Outstanding nematocidal activity seen in solid organic . . .

appears to function as a contact nematocide against free-living forms

Uses: As a solid nematocide for vegetables, field crops, fruits, ornamentals, and turf; and as a pre-emergence herbicide for broad-leaved and grass weed species.

Features: Tests indicate that product has outstanding nematocidal activity and that it appears to function as a contact nematocide against free-living forms.

Description: Chemically, PRD is 3,4-dichlorotetrahydrothiophene 1,1-dioxide. A crystalline solid, it melts at 129-131°C and boils at 186°C under 10 mm (Hg). At 25°C, approximately 0.27 gm will dissolve in 100 ml water. Tests show that concentrations of about 40 lb/acre should be effective, and that at least 30 days should elapse between treatment and planting. As far as toxicity, present data indicate it is no more hazardous than many commercial pesticides.

(PRD is available on a sample basis to qualified investigators from Diamond Alkali Co., Dept. CP, Union Commerce Bldg., Cleveland 14, Ohio . . . or check 1551 opposite last page.)

Have You Tried New

Dow Corning

ANTIFOAM B

Processors who have tested Antifoam B say it is the easiest-to-use, most effective and most stable

silicone defoamer

ever developed!

- Ready for instant use.
- Disperses immediately in aqueous solutions.
- Stays in uniform dispersion.
- Extremely stable — won't separate, cream or lose its effectiveness even after freezing or boiling.
- Effective in minute concentrations.
- Can be diluted with water.

FREE TRIAL
Write today for a generous free sample.
Dept. 3214

first in silicones
DOW CORNING CORPORATION
MIDLAND, MICHIGAN

When inquiring check 1552 opposite last page

Low cost, light color featured in domestically produced polymer waxes

Uses: Emulsifiable waxes for polishes, carbon paper, paper and textile sizings, lubricants, and applications where domestically oxidized microcrystallines are presently used.

Features: Waxes are reported to cost less, and have better color, than similar foreign-produced materials.

Description: Waxes consist of Fischer-Tropsch hydrocarbons, imported from South Africa, which are oxidized to form emulsifiable waxes. Series of six waxes are available with acid values ranging from 5 to 36. These have various emulsifying properties and hardnesses.

(Fisher-Tropsch polymer waxes are product of Aerogon Chemical Industries, Dept. CP, 240 Broadway, New York 7, N.Y. . . . or for more information check 1553 opposite last page.)

Non-woven fabric can be heat-sealed, makes good plastic backing, holds embossed patterns . . .

product combines natural and synthetic fibers

Uses: Material can be used with plastics, such as upholstery and auto interiors, and in packaging applications. It makes a good filling and backing material.

Features: Fibers are held together with a thermoplastic binder. This permits electronic "stitching" (heat sealing) of the fabric and also permits the fabric to hold any embossed pattern.

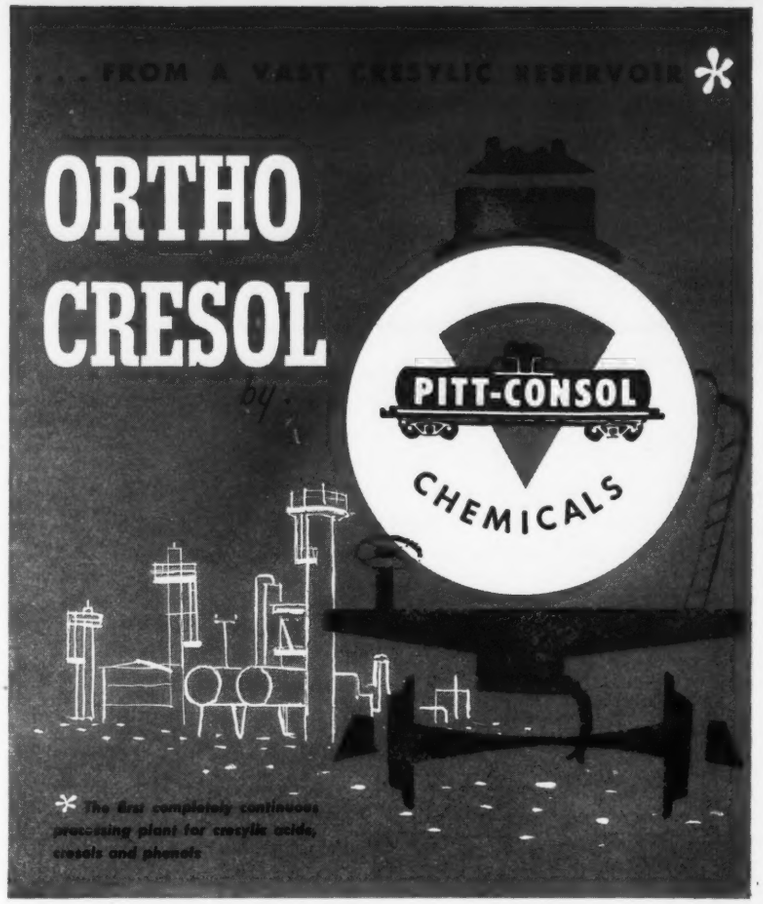
Description: Non-woven fabric is made of almost any cardable fiber or combination, natural or synthetic. Resin content can vary from 15 to 45% and thickness from 1/16 to 2". Weight can vary from 4 ounces to above 16. A 72" width is preferred. Color is natural.

(AllFab is a product of The Felters Co., Dept. CP, 210 South St., Boston 11, Mass. . . . or for more information check 1554 opposite last page.)

Lists data for 42 fine chemicals

Booklet of eight pages lists 42 fine chemicals used in perfumes, soaps, flavors, and pharmaceuticals. Structural formula, standard packaging data, and known and suggested uses are included.

"Fine Chemicals" is issued by Shulton, Inc., Dept. CP, 630 Fifth Ave., New York 20, N.Y. When inquiring specify 1555 on form opposite last page.


. . . FROM A VAST CRESYLIC RESERVOIR *
ORTHO CRESOL
PITT-CONSOL
CHEMICALS
* The first completely continuous processing plant for cresylic acids, cresols and phenols

When you need a dependable source for top quality ORTHO CRESOL in *volume*, you can count on PITT-CONSOL to deliver . . .

After years of research PITT-CONSOL has developed a new, continuous process for producing ORTHO CRESOL of high purity. With an abundant raw material supply of petro-chemical and coal tar origin, PITT-CONSOL offers a reliable reservoir from which you can draw your ORTHO CRESOL needs. Up-to-date equipment operated by skilled technicians, and modern analytical control methods assure consistent uniform quality. Close proximity to road, rail, and water simplify delivery.

PITT-CONSOL can supply in bulk quantities meta para cresols, cresylic acids, phenols, and xylenols . . . For more information or complete technical assistance, please write or call.

PITT-CONSOL
CHEMICAL COMPANY
191 DOREMUS AVE., NEWARK 5, N. J.

A SUBSIDIARY OF PITTSBURGH CONSOLIDATION COAL CO.

When inquiring check 1556 opposite last page

Don't Let The Odor Imp Menace Your SALES EFFORTS!

DEODALL®#1 has proved effective in commercial practice for masking solvent odors and the unpleasant scent of other petroleum products. *Deodall #1* gives high performance at *low* cost in a wide variety of applications. Why not send us a sample of your product for laboratory study and recommendations.

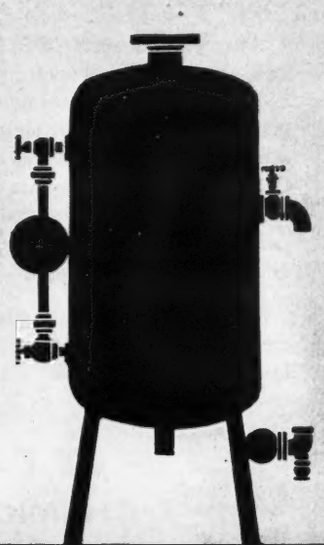
SINDAR® Corporation
Industrial Aromatics and Chemicals
330 West 42nd Street, New York 36, N. Y.
Branches: Philadelphia • Boston • Cincinnati • Detroit
Chicago • Atlanta • Seattle • Los Angeles • Toronto

When inquiring check 1557 opposite last page

The march to SAVINGS

HENSZEY *Flash Tanks*

as part of your automatic continuous blowdown system



HENSZEY CO., Dept. C • Power Plant Division • Watertown, Wis.
Also Manufacturers of Multiple Effect and Single Effect Evaporators and Tube Preheaters

When inquiring check 1558 opposite last page

Stabilizes starch adhesive viscosity against changes in agitation, temp, and starch variation . . .

also permits reduction of starch content without losing viscosity of mix

Uses: As a viscosity stabilizer in starch formula adhesives, especially for corrugated box manufacturing.

Features: Stabilizer helps maintain proper viscosity despite agitation, pumping, circulation, temperature change, and starch variations. It reduces overall cost of adhesive because "free water" is reduced to a point where 100 lb of starch per batch can be saved without losing viscosity of mix, because starch is fully utilized.

Description: Supplied as a powder, Stabilizer #822 is free-flowing, non-lumping, and cold-water soluble. It is added at a rate of 6 lb per 333 gal mix and is introduced in the lower mixer to 110°F water, before carrier batch is cooked in upper mixer and before starch and borax are added. Stabilizer can also be used to salvage improperly made batches.

(Adhesive stabilizer is a product of Morningstar, Nicol, Inc., Dept. CP, 630 W. 51st St., New York 19, N.Y. . . . or for more information check 1559 on the convenient Reader Service slip which is located opposite last page.)

Evaporation rates for fast, medium, and slow evaporating solvents

Technical bulletin of eight pages contains evaporation data as determined by manufacturer's thin film evaporometer. Charts show percent of weight evaporated in seconds for fast, medium, and slow evaporating solvents.

Tech Bul SC:56-69 is issued by Shell Chemical Corporation, Dept. CP, 50 W. 50th St., New York 20, N. Y. When inquiring specify 1560 on form opposite last page.

don't look now . . .

. . . but there's an important message for VIPPs only

. . . on page 81

cut costs with POLYFON

A NEW CONCRETE ADDITIVE THAT:

- reduces water requirements by 4-6 gallons per cubic yard.
- lowers cement content as much as 10%.
- improves workability and strength.

There are no sugars in POLYFON T. Retarding effect, and chemicals usually added to overcome it, are therefore minimized.

As little as 0.05-0.1% POLYFON T based on cement weight, or 1-2 pounds for every 20 bags, does the job.

POLYFON T is a sodium lignosulfonate derived from abundant, low-cost kraft lignin. It is quality-controlled to assure maximum purity.

Send for bulletin 301 and samples for testing.

Polychemicals DIVISION
West Virginia Pulp and Paper Company
CHARLESTON A, SOUTH CAROLINA

When inquiring check 1561 opposite last page

This looks like something we'll take to keep our youthful vim, vigor . . .

L-lysine maintains tissue-building and health

Along with the announcement of the first commercial fermentation production of L-lysine comes the possibility that we'll all soon be taking this amino acid as a dietary supplement to meet nutritional demands during all periods of life — from infancy through "senior citizenship."

It seems that L-lysine is one of the eight amino acids that are considered essential to human nutrition. These building blocks of proteins cannot be made by the body in amounts adequate to maintain tissue-building and good health.

Protein, as contrasted to fats and carbohydrates, is the compound from which living tissue is built. There are probably hundreds of thousands of different compounds, and by the time a given amount of protein has been in the body about 45 days, half of it has either been used or destroyed and eliminated.

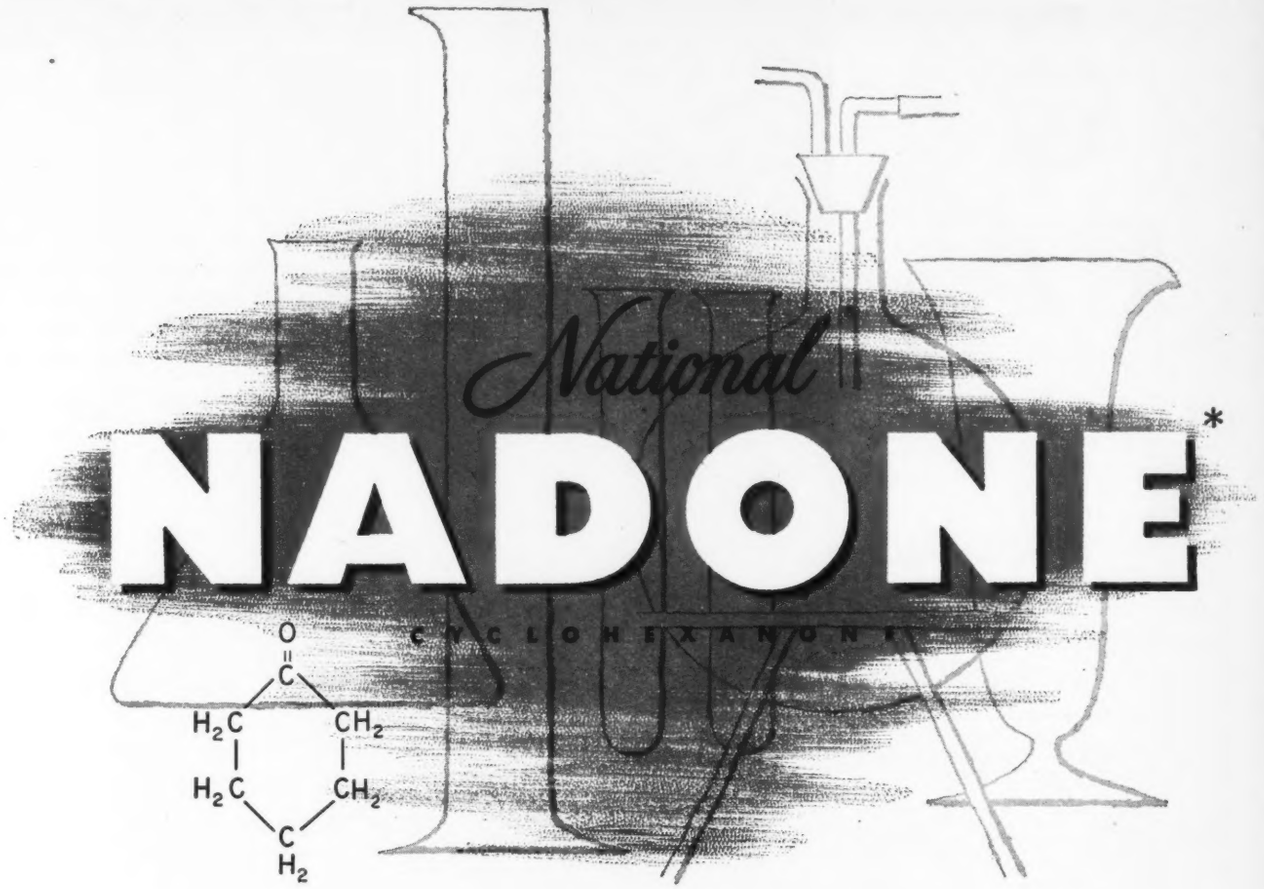
This creates quite a demand, and the proteins must be replaced, either by synthesis inside the body (by bacteria) or through the diet. Animal proteins are a better source of important amino acids than plant proteins. Therefore it takes about twice as much plant protein to give the same effect as a given amount of meat protein.

There are eight essential amino acids, one of which is L-lysine. Our bodies must receive all, *and* in the right proportions. Lack of one amino acid effectively stops full utilization of all others.

In our average diet, approximately one-fifth of our protein intake is obtained from cereals. Cereals are deficient in the acid lysine, therefore addition of supplementary lysine to the diet should give

(*Please turn to page* 58)

For more information on product at right, specify 1562 . . . see information request blank opposite last page.



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NADONE is the brand name for National Cyclohexanone . . . highest quality volume-production cyclohexanone offered. Minimum purity 99.0%!

National Aniline now gives the resin, plastics, coatings and chemical industries a dependable new source of supply. Production is fully integrated within Allied Chemical and volume is freely available in tank cars or drums from our well-situated plant at Hopewell, Virginia.

Working samples of NADONE are available to show prospective users its exceptional quality.

Bulletin I-19 gives properties, reactions, suggested uses and bibliography. Use the convenient coupon.

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D-4

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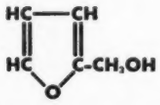


QO Furfuryl Alcohol modified urea resins form gap-filling glues of exceptional strength. Such adhesives are flexible, resist cracking and deterioration upon aging. They reduce shrinkage and assure an enduring bond under many conditions of pressure, temperature, and glue line thickness.

MANY OTHER USES. Versatile FA also dissolves nitrocellulose, dyes and many resins; acts as a wettant and reactive solvent for resin-bonded abrasives; and forms resins which cure at room temperature to acid and alkali resistant products.

If your glue supplier cannot furnish this patented adhesive, write to us for names of the manufacturers.

Write for your copy of

TECHNICAL BULLETIN 205

"General Information, Physical Data, Chemistry and Uses of Furfuryl Alcohol"

The Quaker Oats Company
CHEMICALS QO FURAN CHEMICALS DEPARTMENT

336N **The Merchandise Mart, Chicago 54, Illinois**
Room 536N, 120 Wall Street, **New York 5, New York**
Room 436N, 48 S.E. Hawthorne Blvd., **Portland 14, Oregon**
In the United Kingdom: Imperial Chemical Industries, Ltd., Billingham, England
In Europe: Quaker Oats-Graanproducten N. V., Rotterdam, The Netherlands; Quaker Oats (France) S. A., 3, Rue Pillet-Will, Paris IX, France; A/S "Ota," Copenhagen, S. Denmark
In Australia: Swift & Company, Pty., Ltd., Sydney
In Japan: F. Kanematsu & Company, Ltd., Tokyo

When inquiring check 1563 opposite last page

Two series of quaternary ammonium chlorides are the first entries from this company's development program since they entered commercial production of chemical intermediates early last fall. At that time, the company introduced three imidazolines. Research efforts were aimed at development of new products. First to emerge from this program are —

salt-free quaternaries that are active in acid media

Uses: These six compounds should make outstanding emulsifiers, corrosion inhibitors, anti-static agents, and bactericides since they are effective cationic wetting, foaming and dispersing agents, excellent film-formers, and show marked substantivity to fibers.

Features: The quaternaries retain their good bactericidal characteristics under acid conditions, usually as low as pH 5. (Most quaternaries lose this property when pH drops below 8.) The compounds make excellent acid corrosion inhibitors for steel in oil systems.

Because they are produced by alkylation of cyclic tertiary amines, these quaternaries are entirely free of inorganic salts. They have unusually good solubility char-

SIX QUATERNARY AMMONIUM CHLORIDES

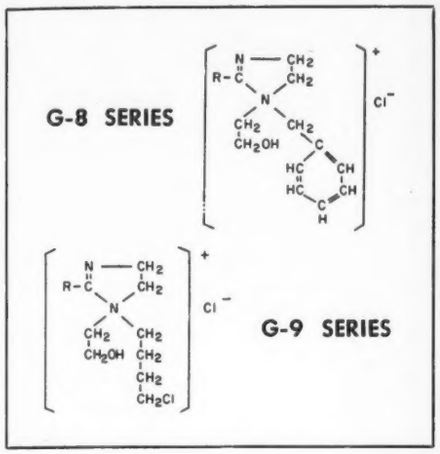
Typical Analyses

Nalquat	G-8-11	G-8-12	G-8-13	G-9-11	G-9-12	G-9-13
Molecular weight	413	476	477	413	476	477
% Quaternary (in isopropanol)	58-62	58-62	58-62	58-62	58-62	58-62
Sp gr (@ 60°F)	0.957	0.968	0.983	0.964	0.960	0.968
Pour Point (°F)	−11	−25	−9	−7	*	−19

*G-9-12 is viscous at temp $< -36°$

Identification of the Normal Hydrocarbon Chain (R)

Last Number of Nalquat	Identification of R
−11	Mixed 11, 13, 15, and 17-carbon chains
−12	Mixed heptadecenyl and heptadecadienyl
−13	Heptadecenyl



acteristics, in both polar and non-polar solvents.

Because of their hydrophilic hydroxyl group, and the quaternary nitrogen that is part of a 5-membered ring (instead of being an acyclic nitrogen, substituted by alkyl or aryl groups), these compounds exhibit excellent emulsifying properties. They also impart substantivity to emulsions and increased bactericidal activity. The long straight hydrocarbon chain in the cation gives the compounds surface-active properties.

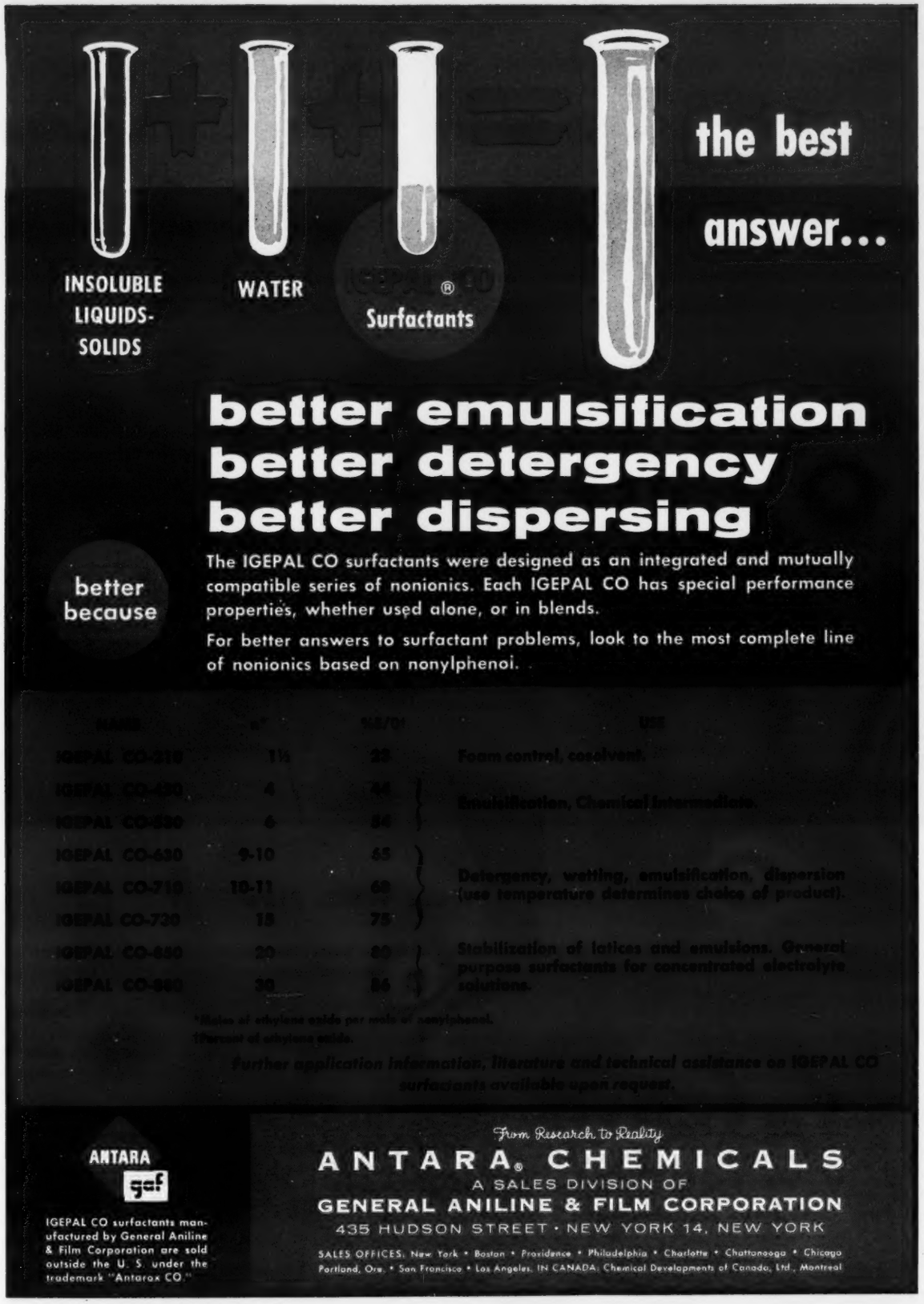
Description: Called Nalquats, the series of quaternary ammonium chlorides are derived from the trio of cyclic tertiary amines introduced last fall under the name of Nalcamines.

The G-8 series is derived from benzyl chloride and each of the three Nalcamines. The G-9 series is formed by reacting 1,4-dichlorobutane with the Nalcamines on an equimolar basis. The structural formulas show the nitrogen at the "one" position as being basic. However, there is as much evidence showing nitrogen at the "three" position is basic.

Comparing the series, we find that in general the G-9's make better germicides. We also see the quaternaries with the longer chains having better oil solubilities, but all six Nalquats have exceptional solubility in non-polar solvents. For example, all six have more than 50% solubility in gasoline. All six make clear water solutions. The different makeup of the members gives a choice of hydrophobic/hydrophilic balances.

On a price-performance basis, these products should be very competitive with other industrial grade quaternaries. The G-9-12 and -13 materials exhibit excellent bactericidal action and will make clear water solutions. They are priced below most industrial grade quaternaries offering both these characteristics. As emulsifiers, the series should find specialized applications.

(Nalquat G-8 and G-9 series are products of Industrial Process Chemicals Dept., National Aluminate Corp., Dept. CP, 6294 W. 66th Pl., Chicago 38, Ill. Check 1564 opposite last page.)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better because
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When inquiring check 1565 opposite last page

(*Continued from page* 55)

cereals a protein balance similar to meat and fish. This should improve efficiency of our diet. Our bodies place more importance on the type of amino acid than on its source.

Now that lysine is commercially available, even more research will get underway. This acid is being marketed in the form of L-lysine monohydro-chloride. It is free from D-lysine, the stereoisomer, which cannot be utilized by the body. The pure white crystalline 80-mesh powder has a guaranteed potency of not less than 98%. Fermentation process is covered by US Patent 2,771,396, and was invented by Dr. L. E. Casida, Jr., of manufacturer's Biochemical Research Labs. Price per pound is $12 in 50-lb lots, and $14 in pound lots.

(L-Lysine is a product of Chas. Pfizer & Co., Inc., Dept. CP, 630 Flushing Ave., Brooklyn 6, N.Y. . . . or for more information check 1566 on form which is located opposite last page.)

Stabilizes clear vinyls at low cost . . .

has good heat and light stability, no odor

Uses: For stabilizing clear vinyls.

Features: Product gives high clarity, good heat and light stability at low cost. It imparts resistance to water absorption and has no odor.

Description: Stabilizer is an unequally modified cadmium inhibitor.

(Ferro 203 Stabilizer is a product of Ferro Corp., Dept. CP, 4150 E. 56th St., Cleveland 5, Ohio . . . or for more information check 1567 on form opposite last page.)

For more information on product at left, specify 1568 . . . see information request blank opposite last page.

matching wits with fire

The fire alarm bell can be the plant equipment most costly to operate.

That is reason enough for Celanese research to develop materials that have reduced the threat of fire in plants and products.

Take Cellulubes, for instance . . . this series of hydraulic fluids and lubricants minimize the possibility of fire and explosion in die casting operations, hydraulic equipment and air and gas compressors.

And now Celanese plasticizers such as Celluflex CEF which impart fire-resistance to varnishes, lacquers, polyurethane foams, thermosetting plastics and polyester resins, thus assuring greater safety in a wide range of end-products.

Whether you must match wits with fire . . . improve a product or search for a better processing method . . . you will be interested in how Celanese research and chemicals can shortcut your work by supplying practical answers to specific problems.

Write to: Celanese Corporation of America, Chemical Division, Dept. 591-B, 180 Madison Avenue, New York 16, New York.

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Agricultural, automotive, aviation, building, electrical, paper, pharmaceutical, plastics, surface coatings, textile.

Produces acrylic resin with improved thermal stability and flow . . .

tests by molders show stability at 20-30°F higher than maximum of other acrylics

Uses: For injection molding of clear plastic parts, especially where complex or hard-to-fill forms are required.

Features: Improved formulation ups maximum temperature molding limits 20-30°F higher than maximum of other acrylic resins. Because of resin's greater stability, higher temperatures can be used which give improved flow. Thus, thin parts are made with fewer surface blemishes and flow lines and thicker parts are produced without voids. In some production jobs, shorter cycles have resulted.

Description: Called Lucite 140, product represents an improvement in general stability and flow over previously available lucite resin.

(Lucite 140 is a product of E. I. du Pont de Nemours & Co. (Inc.) Dept. CP, Wilmington 98, Del. . . . or for more information check 1568A on form opposite last page.)

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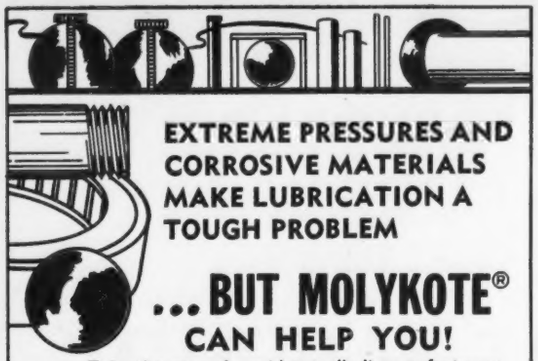
West Coast: Wilson Meyer Co., San Francisco; Los Angeles; Portland; Salt Lake City; Seattle.

When inquiring check 1569 opposite last page



EXTREME PRESSURES AND CORROSIVE MATERIALS MAKE LUBRICATION A TOUGH PROBLEM

...BUT MOLYKOTE® CAN HELP YOU!

Take the case of a midwest alkali manufacturer: In drying bicarbonate of soda, several kilns were used in which 24" diameter chilled cast iron bearings supported a 24" steel shaft. These bearings rotate slowly carrying a weight of 40,000 pounds. The bearings wore rapidly. The temperature varied from 400° to 500°F and this caused the lubricating grease to melt resulting in product spoilage. A problem? It certainly was! Now . . . the bearings are given 4 coats of MOLYKOTE M-88, dry film lubricant, and this is the only lubricant applied. Inspection at 4-month intervals shows negligible wear. Product spoilage is eliminated.

This is only one of many interesting case histories in our Field Report File. If you have a lubrication problem, send right away for Field Report 2, covering the CHEMICAL industry.

THE ALPHA MOLYKOTE CORP.

Main Factories: 65 Harvard Avenue, Stamford, Conn.
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When inquiring check 1570 opposite last page

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A functional extender pigment especially adapted to PVA formulation for scrubability, leveling and flat sheen. It is easily wetted and dispersable. pH of 6.5–6.8. Non-crystalline structure. Economical in cost.

TAMMS INDUSTRIES, INC.

When inquiring check 1571 opposite last page

Piperazine handles easily when it's in liquid form . . .

eutectic contains 40% water, melts at 35°C

Eutectic mixture of piperazine contains about 40% water and melts at 35°C. Eutectic handles and melts more easily than the pure compound, which has a 106°C melting point, is hygroscopic, and requires great care in handling.

(Technical piperazine is a product of Fine Chemicals Div., Carbide & Carbon Chemicals Co., a Div. of Union Carbide & Carbon Co., Dept. CP, 30 E. 42nd St., New York 17, N.Y. . . . or for more information check 1572 opposite last page.)

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High-grade cuprous chloride makes efficient catalyst . . .

particularly designed for producing acrylonitrile, phthalocyanine pigments

Uses: For catalytic production of acrylonitrile, phthalocyanine pigments, and other compounds.

Features: Product has high cuprous content and low impurities.

Description: The greyish-white powder, available commercially, has these properties:

Analysis (max)	
CuCl (%)	97-99
S (ppm as sulfide)	15
Fe (ppm)	0.02
Insol. in HCl (ppm)	0.05
Screen analysis	
Through 20 mesh (%)	100
Through 200 mesh (%)	94
Sp gr	3.53

(Cuprous chloride is a product of Metalsalt Chemicals, Inc., Dept. CP, PO Box 3, Station D, Atlanta 18, Ga. . . . or for more information check 1575 on form opposite last page.)

Organo-mag studies detailed in book

Three volumes totaling over 2000 pages bring an exhaustive summary of investigations on organic compounds of magnesium, including alkyl and aryl halides. Chemical reactions since 1899 are collected and systematized, together with work described in Russian papers, unavailable thus far. In all, 13,395 reactions are listed, cross-indexed, and arranged according to Chemical Abstracts indexing. The three volumes are divided in five sections covering summary of total reactions, formula-index of end-products of reactions, list of separate magnesium-organic compounds, literature sources, and supplementary index of coauthors.

To obtain "A Handbook of Magnesium-Organic Compounds" remit $72.00 direct to Pergamon Press, Dept. CP, 122 E. 55th St., New York 22, N.Y. When inquiring specify 1576 on form opposite last page.

Silicone products reference guide

Almost 150 silicone products are described in manufacturer's 12-page catalog. Products, grouped by usage, include water repellents, silicone rubber, dielectrics, paint vehicles, lubricants, fluids, and defoamers.

"Silicone products 1957" is issued by Dow Corning Corp., Dept. CP, Midland, Mich. Specify 1577 opposite last page.

EXON 468...the easy way to make FLOORING finer...and faster!

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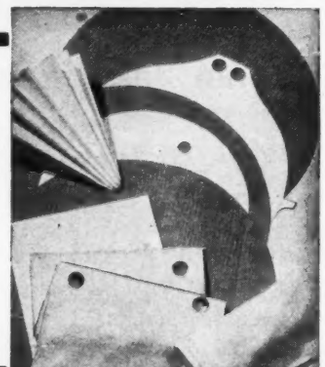

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When inquiring check 1580 opposite last page

CHEMICAL MATERIALS

Modified microcrystalline waxes impart excellent flow properties to carbon paper inks . . .

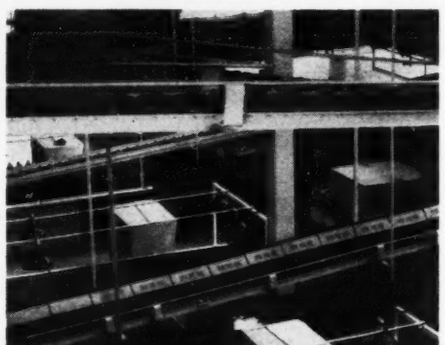
inks are non-thixotropic, have low viscosity

Uses: In manufacture of carbon paper inks. They are especially suitable for one-time-use carbons.

Features: Excellent flow properties are imparted to carbon paper inks by the waxes. When properly formulated, inks are non-thixotropic and have low viscosity and zero yield value even under high pigment loading. Oil retention is good. Lab tests show that carbon papers have good clarity, color, and write-off.

Description: Waxes are prepared by modification of microcrystalline wax. One of the series now in production, dubbed WB-2 Wax, melts about 185°F, is reddish brown in color, and is priced at 45c per pound.

(WB Waxes are products of Bareco Wax Co., a Div. of Petrolite Corp., Dept. CP, PO Box 2009, Tulsa, Okla. Check 1581 opposite last page.)



Protects plant's interior from effects of soda ash

The interior of the Owens-Illinois Co. glass container plant in Portland, Ore., was painted with rubber resin-based enamel (manufactured by the Rodda Paint Co. of Portland) as protection against the harsh effects of soda ash, one of the plant's raw materials. Use of the synthetic rubber resin (Pliolite S-5) has resulted in attractive, high-strength, quick-drying paint films with minimum odor.

(Pliolite S-5 base for enamel is product of Chemical Div., Goodyear Tire & Rubber Co., Dept. CP, 1144 E. Market St., Akron, Ohio or check 1582.)

DECOLORIZE by adsorption

Activated Carbon adsorbs colors, contaminants, and undesired odors from liquids.

Passage thru a bed of granular Activated Carbon or agitation with powdered A.C. does the complete job.

Ask for samples so that you can try Activated Carbon on your own problem.

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When inquiring check 1583 opposite last page

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When inquiring check 1584 opposite last page

Adhesives for chloride vinyl films free from dangerous solvents . . .

emulsions are based on new copolymer, and may be thinned with water

Uses: For adhering vinyl film to cloth, paper, and paperboard.

Features: Based on new copolymer, emulsions are free from dangerous solvents eliminating fire hazard and problem of toxic fumes. All may be thinned with water.

Description: Resyn Emulsion 33-8020 is a smooth, white, fluid emulsion containing approximately 54% solids with viscosity of 1000-1500 cps. It may be applied by reverse-roll coater, gravure, or air knife. Preferred coating weight for vinyl to cloth is ½ oz to 1½ oz of dry adhesive per sq yd. For vinyl to paper, 8 lb per ream of dry adhesive is desirable. Temp from 200-250°F is required for drying.

Resyn Emulsion 33-8010 has similar properties, but its viscosity of 5000 cps is heavier and it is preferred for knife coating. It is also recommended for lamination of vinyl film to latex saturated paper.

Resyn Emulsion 33-8030 is a water-base material, but contains some solvent which is not flammable. It is preferred for wet combining of vinyl chloride to paperboard and wood. Containing approximately 49% solids, it has a viscosity of 1000 cps. It may be applied in the same manner as Resyn 33-8020.

(Resyns 33-8010, -8020, -8030 are manufactured by National Adhesives Div., National Starch Products Inc., Dept. CP, 270 Madison Ave., New York 16, N.Y. . . . or for more information check 1585 on form opposite last page.)

Produces Isobutyronitrile in commercial quantities . . .

material finds use as chemical intermediate

Company's Longview, Texas, plant has gone on stream in full-scale production of isobutyronitrile. This is the first time the compound has been made in substantial quantities in this country. One important product made from this chemical is the insecticide Diazinon, effective in control of flies and approved for use in dairy barns.

The commercial isobutyronitrile boils between 100 and 105°C and contains a maximum of 1.0% aldehydes (as carbonyl) and 0.8% water. Sp gr (20°/20°C) is 0.7690-0.7720. Product is shipped in 55-gal steel drums.

(Isobutyronitrile is a product of Eastman Chemical Products, sub. of Eastman Kodak Co., Dept. CP, 260 Madison Ave., New York 16, N.Y. . . . or for more information check 1586 on form opp. last pg.)

CSC NITROPARAFFINS

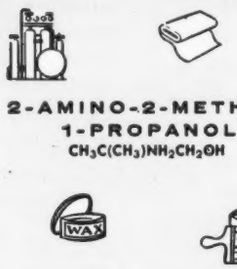
NITROMETHANE
CH_3NO_2

NITROETHANE
$CH_3CH_2NO_2$

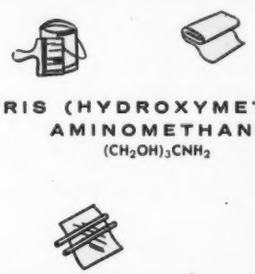
1-NITROPROPANE
$CH_3CH_2CH_2NO_2$

IMPROVING PROCESSES AND PRODUCTS

2-NITROPROPANE
$CH_3CHNO_2CH_3$



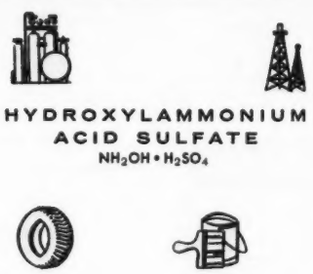
2-AMINO-2-METHYL-1-PROPANOL
$CH_3C(CH_3)NH_2CH_2OH$



TRIS (HYDROXYMETHYL) AMINOMETHANE
$(CH_2OH)_3CNH_2$

FOR AMERICA'S MAJOR INDUSTRIES

2-AMINO-2-METHYL-1, 3-PROPANEDIOL
$CH_2OHC(CH_3)NH_2CH_2OH$



HYDROXYLAMMONIUM ACID SULFATE
$NH_2OH \cdot H_2SO_4$

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IN CANADA: Reliance Chemicals, Ltd., Montreal. IN MEXICO: Comsolmex, S.A., Mexico 11, D. F.

CSC INDUSTRIAL CHEMICALS

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When inquiring check 1589 opposite last page

Improved resistance to paraffinics makes resin especially useful in coating formulations . . .

color retention, pigment wetting properties are excellent

Uses: In a wide variety of vehicle formulations such as water-resistant coatings, masonry paints, silo paints, and swimming pool paints. It is useful in coatings which must have resistance to gasoline, kerosene, or mineral oils.

Features: Resin has excellent resistance to water, acids, alkalis, salts, and aromatic and paraffinic hydrocarbons. Pigment wetting and color retention properties are excellent. Resin forms tough films that have good adhesion to most surfaces.

Description: This hydrocarbon resin is soluble in aromatics. Properties include:

Sp gr (@15.5°C)	1.04-1.06
Softening point (°C)	100-105
Color (coal tar scale, max)	2
Viscosity (G-H 60% tol.)	Z-1

(Piccoflex 100A is a product of Pennsylvania Industrial Chemical Corp., Dept. CP, Clairton, Pa. . . . or for more information about manufacturer's product reader may simply check 1590 on form opposite last page.)

Organic sequestrant is economical and effective chelating agent . . .

can be used with metallic ions in aqueous solutions over entire pH range

Uses: Compound can be used as a solubilizer for rust, scale and unfused or hydrated metallic oxides in neutral, acid, alkaline and caustic solutions. It also functions as a water-softener and solubilizer for heavy metal soaps in aqueous solutions.

Features: Material is compatible with surface-actives. It is also stable in reducing and mild oxidizing agents and on prolonged boiling in acid and basic solutions. It serves as economical, effective chelating agent for metallic ions in aqueous solutions over entire pH range.

Description: Organic, high molecular weight, polyhydroxy compound is light amber and has slight aromatic odor. Properties are: moisture content, 10% by weight; specific gravity, 1.2; flash point, none; decomposition point, polymerizes on heating at 150°C.

(Monitor A, organic sequestrant and solubilizer, is product of Globe Compound Co., Inc., Dept. CP, Waterbury-Bristol Road, Waterbury 12, Conn. . . . or for more information check 1591 on form opposite last page.)

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Leak Lock

When inquiring check 1592 opposite last page

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FACTORY: *Clifton, N. J.*

When inquiring check 1593 opposite last page

Polyester/glass-mat laminate resists arc and flame . . .

features dimensional stability, impact strength

Uses: With good electrical and mechanical properties, laminates can be used for armature slot wedges, spacers, switchboard panels, insulators and mechanical applications such as supports, panels, and cams.

Features: Laminate has been approved as a flame-resistant material by Underwriters' Laboratory. Arc resistance is high, being 180 seconds under ASTM D-495-48T (Condition A) for a 1/8" laminate. Dimensional stability and impact strength are also high, as is chemical resistance to most acids and solvents.

Description: Laminate is available in three sheet sizes: 32x36, 32x48, and 32x74". It is made by impregnating glass fiber mats with a liquid polyester resin containing inorganic fillers and a catalyst. These mats are heat treated under low pressure to produce a hard laminate.

Laminate can be sole support of current-carrying parts at temperatures up to 150°C. It has good dielectric-loss properties under dry conditions and reasonably good dielectric strength under wet conditions.

(Phenolite GP-9204 laminates are products of National Vulcanized Fibre Co., Dept. CP, 1056 Beech St., Wilmington 99, Del. Check 1594 opposite last page.)

Lists tagged organics

Two-page list itemizes 16 additions to line of C-14 organics, and is issued by Tracerlab, Inc., Dept. CP, 130 High St., Boston 10, Mass. Check 1595 opposite last page.

For more information on product at right, specify 1596 . . . see information request blank opposite last page.

DU PONT

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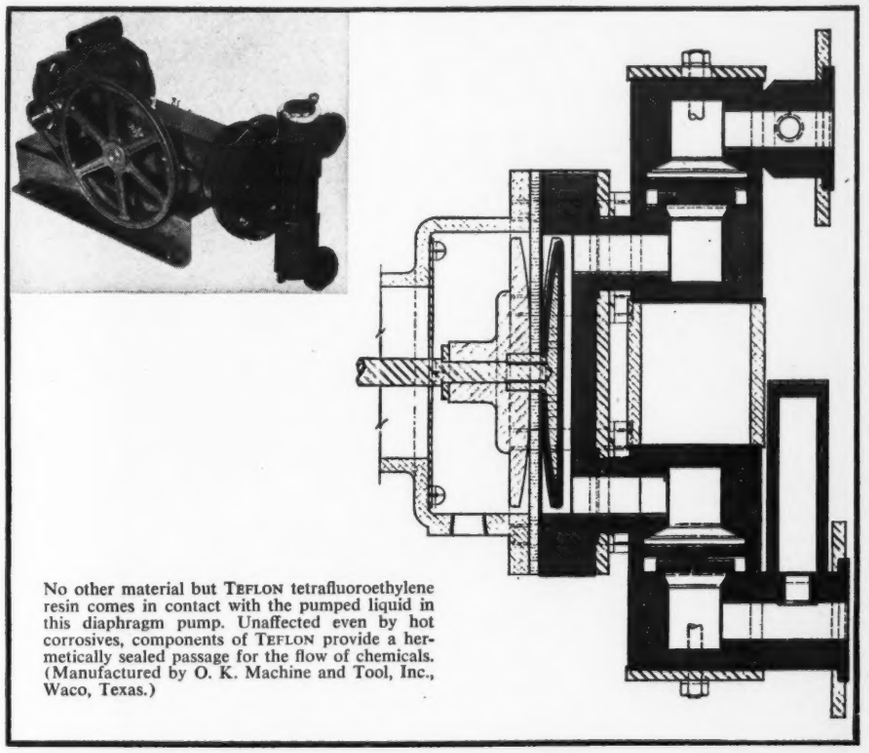
CHEMICAL ENGINEERING NEWS

LATEST PROPERTY AND APPLICATION DATA ON TEFLON® tetrafluoroethylene resin

Du Pont TEFLON® provides maximum resistance to corrosives in new chemical pump

All passages and working diaphragm made of TEFLON



No other material but TEFLON tetrafluoroethylene resin comes in contact with the pumped liquid in this diaphragm pump. Unaffected even by hot corrosives, components of TEFLON provide a hermetically sealed passage for the flow of chemicals. (Manufactured by O. K. Machine and Tool, Inc., Waco, Texas.)

Pump head, valve components, connecting flanges and nipples are all made of solid TEFLON in the new positive displacement pump pictured here. The pump is of the diaphragm type. The large diaphragm impeller can be faced with TEFLON because TEFLON is a tough, flexible material. TEFLON easily withstands the vibrational load of the pump shaft, which operates at a pump rpm of 350. This type of construction eliminates churning of the pumped liquid, since the linear motion of the diaphragm is only 9 feet per minute.

The structural use of TEFLON in this pump is made possible by its strength and machinability. Sturdy components of TEFLON are assembled to form the hermetically sealed pump head. There are no packing glands or rotary seals to leak irritating or obnoxious fumes. The pump has sufficient dry lift to eliminate initial priming of the pump head.

Since the liquid pumped does not contact any other material than TEFLON, the pump will successfully handle chemicals such as alkaline solutions, all acids of full or medium concentration, and petroleum hydrocarbons. The pump is rated for operation from −50° F. to 300° F. TEFLON itself can be used at temperatures to 500° F. and displays excellent properties at extremely low temperatures.

TEFLON tetrafluoroethylene resin is inert to nearly all chemicals and solvents in commercial use. The few exceptions to this include attack by the alkali metals under certain conditions. At high temperatures and pressures, halogens and certain halogenated chemicals and solvents may also affect TEFLON.

The unique combination of characteristics embodied in TEFLON tetrafluoroethylene resin has made it an indispensable material of the chemical industry. Due to its extremely low coefficient of friction and its chemical inertness, TEFLON is widely employed for bearings and packings. It is ideal for use as seals and gaskets.

If you are planning new chemical equipment, you may well benefit by looking into the properties of Du Pont TEFLON. This remarkable engineering material has saved money for many firms by eliminating replacements and costly downtime.

TEFLON®

is a registered trademark...

TEFLON is the registered trademark for Du Pont tetrafluoroethylene resin, and should not be used as an adjective to describe any other product or any component part; nor may this registered trademark be used in whole, or in part, as a trade name for any product.

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Mail this coupon for additional property and application data on TEFLON.

E. I. du Pont de Nemours & Co. (Inc.), Polychemicals Dept.
Room 82, Du Pont Building, Wilmington 98, Delaware

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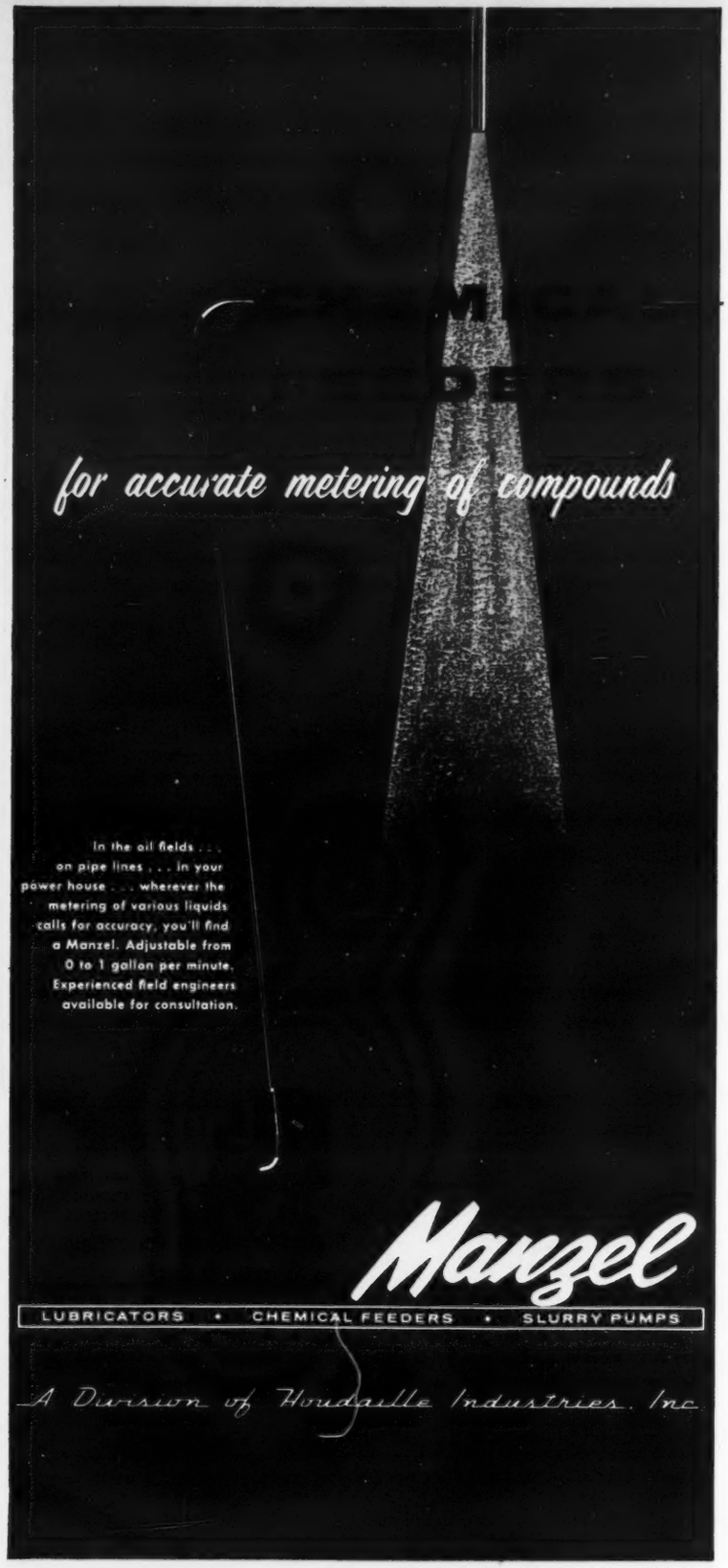
In Canada: Du Pont Company of Canada (1956) Limited, P. O. Box 660, Montreal, Quebec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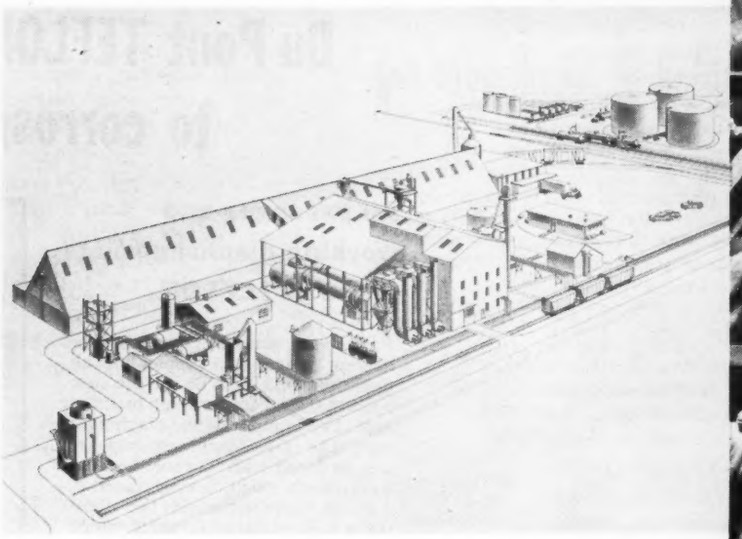
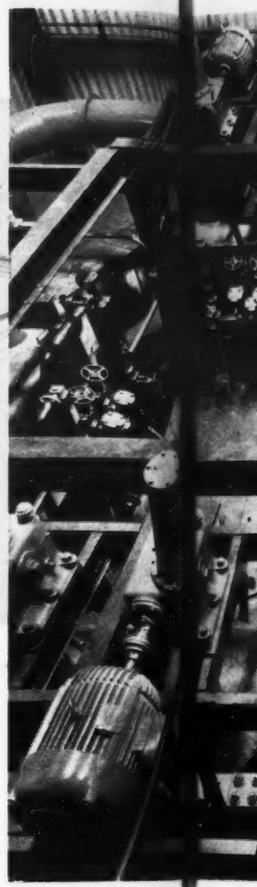
ideas — from other industries and nuclear field . . . new trends in research processes, services



Total production of new plant adds up to 950 tons of plant food materials per day



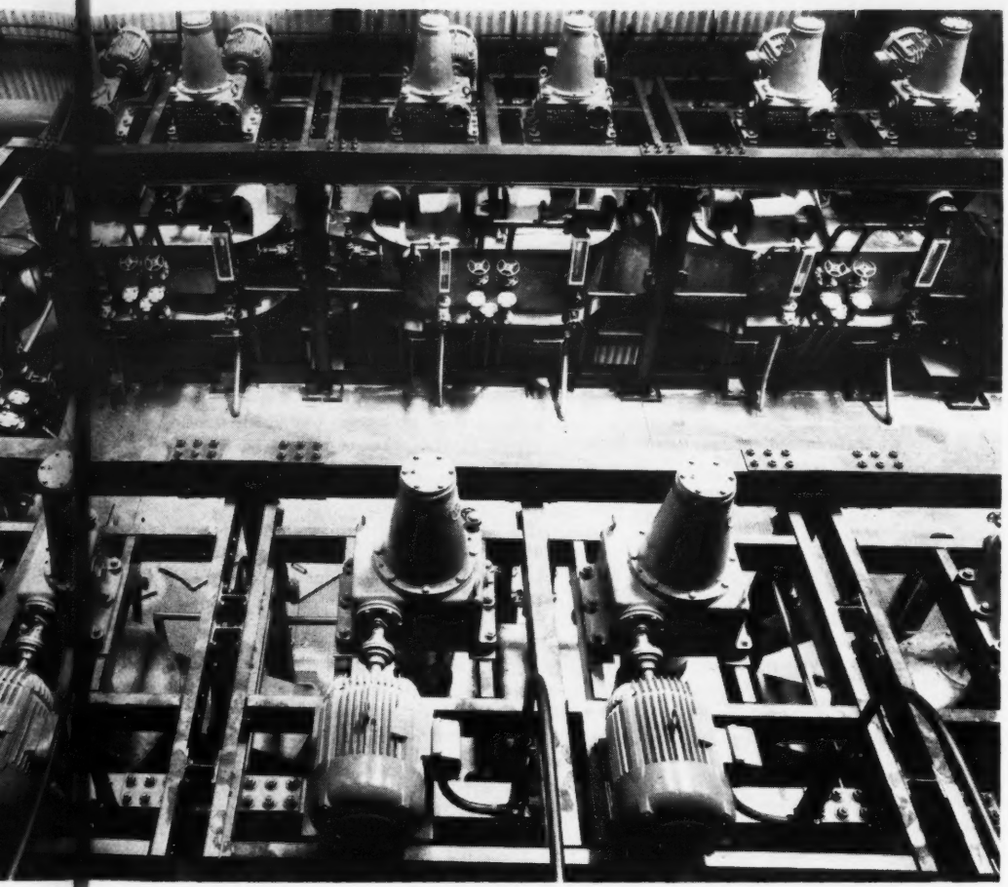
Calspray's new multi-million dollar plant at Richmond, California, is first in US to use PEC process for making fertilizer. Using nitric acid instead of sulfuric for acidulation, giant installation . . .

produces 950 tons plant fo

Acid, upon neutralization, becomes part of nitrogen plant food in the fertilizer.

In a departure from conventional US practice, chemical fertilizer is being made with nitric instead of sulfuric acid at California Spray-Chemical Corporation's (Calspray) new multi-million dollar plant-food project at Richmond, California. Developed by Societe Potasse et Engrais Chimiques (PEC), the process produces, in one set of reactions, complete complexes containing two or all three of the important plant foods.

The acid is used as the acidulating agent for obtaining available phosphoric acid from phosphate rock. By dissolving the rock with the same grade nitric acid as used for making agricultural ammonium nitrate, the acid, upon neutralization, becomes a part of the nitrogen plant food in the fertilizer. The acid, in short, has a twofold use. With phosphate values being derived directly from phosphate rock by the addition of one of the plant foods itself — thus adding nothing to dilute the mixture — it is possible to manufacture



Portion of reactor floor where basic plant food materials are run through series of reactors in initial stages of forming process pellets. Plant is reported to be first in US to use French-developed PEC process

ant food per day

a high concentration of complete fertilizers in a single process, with very high product uniformity.

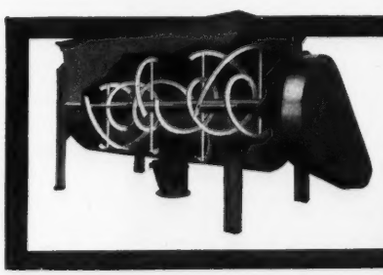
Basic materials for the operations are supplied by the recently completed 300 ton/day ammonia and 250 ton/day nitric acid plant at the Richmond refinery of the corporation's parent company, the Standard Oil Company of California. Part of the ammonia output is oxidized at the acid plant and the rest flows by pipeline to the plant-food plant. Entire output of nitric acid is supplied by pipeline.

Process Description

In the fertilizer plant, ground phosphate rock is acidulated in a series of stainless steel reactors. This produces a fluid slurry consisting of a solution of soluble compounds of P_2O_5, calcium nitrate, and minor amounts of other soluble salts, plus the insoluble components of the phosphate rock in suspension. Depending upon formulation, some sulfuric acid or phosphoric acid is added to slurry, reacting with

(*Please turn to next page*)

Whether you are mixing granular or pulverized, wet or dry materials, Readco's counterflow action spiral ribbon mixers will provide a thorough mix in less time and without material build-up at the bowl ends. These sturdy mixers are built for continuous or batch processing. They can be supplied for pressure of vacuum service, with or without temperature controlling jackets and in working capacities from 1 to 500 cubic feet. Readco also manufactures a complete line of double arm mixers, including laboratory and pilot plant models, vertical mixers and materials handling equipment. Modern laboratory facilities are available to assist you in determining the proper equipment to suit your needs. Write for complete details.



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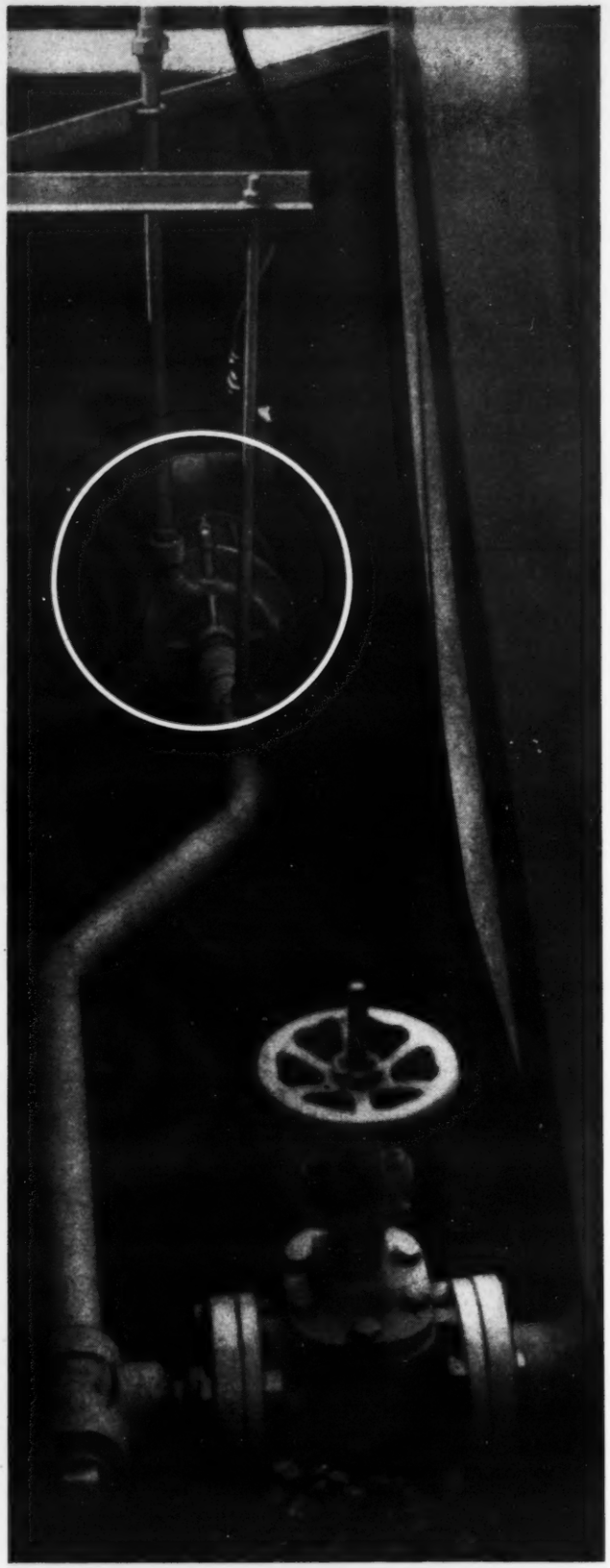

Chempump saves $1000 a year in maintenance costs

handling sulfuric acid at laminates plant of Panelyte Division, St. Regis Paper Co.

This *Chempump* is part of the phenol recovery process at the Trenton, N. J. plant of St. Regis Paper Company's Panelyte Division. The pump operates intermittently for about ten minutes, three times during each shift of a three-shift day. Since its installation, in July 1955, it has been continually on the job, moving about a thousand pounds of 66° Baumé sulfuric acid every day. No maintenance has been performed on the pump since it was installed—not even a bearing inspection. The plant's maintenance superintendent states that this *Chempump* has saved more than $1000 in maintenance expense during its first year of operation.

Originally, a stuffing box pump was used in this service. Leakage corroded the pump frame and base plate to such an extent that the pump had to be replaced three times. Acid which leaked from the stuffing box also ate away the concrete mounting block.

Leakage problems ended with installation of a *Chempump*. *Chempump can't* leak—in or out—because it has no seals, no stuffing box, no packing. External lubrication is never needed, because the bearings are constantly lubricated by the pumped fluid itself.

Chempump can economically solve the problem of problem fluids in your own plant. For details, write to Chempump Corporation, 1300 East Mermaid Lane, Philadelphia 18, Pa. Engineering representatives in over 30 principal cities in the United States and Canada.

Chempump

First in the field...process proved

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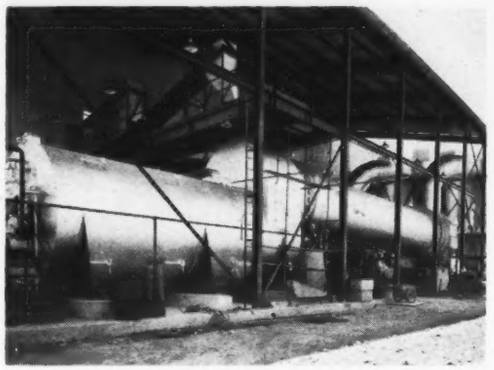
Fertilizer Plant

(*Continued from preceding page*)



Moist granules from granulators are dried in these rotary dryers. Vertical cones in background are part of system for recovering fines removed from finished product

part of calcium to make all P_2O_5 an available plant food. Finally, anhydrous ammonia is added to neutralize the mass and to establish the final balance of the binary relationship, nitrogen and P_2O_5.

Slurry is sent to a paddle mixer where the potash content, if required in the formula, is added as potassium chloride or sulfate. The salts dissolve, assuring complete homogeneity of product. Moisture content is reduced by mixing the mass with fines screened from the end product. As paste thickens, spherical pellets are formed by action of the granulator. Conveying system carries pellets to dryers. Dried product is screened, cooled, and sent to storage.

Formulations containing high percentages of ammonium nitrate are given a diatomaceous-earth coating, similar to the treatment of ammonium nitrate prills, to insure free flow through application equipment.

Other Operations

A second division of the Richmond plant is the ammonium nitrate plant which makes liquid fertilizers. Here, the CSC Stengel process is used. Heart of the process is the Stengel reactor where super-heated anhydrous ammonia vapor joins with pre-heated nitric acid to form ammonium nitrate.

A third division manufacturers ammonium sulfate from anhydrous ammonia and sulfuric acid. A fourth division produces a calcium-ammonium nitrate solution, prepared by treating lime rock with nitric acid. Total production for all the divisions adds up to 950 tons of plant food materials per day (300 tons pelleted, 300 liquid ammonium nitrate, 150 ammonium sulfate, and 200 tons liquid calcium-ammonium nitrate).

(Information courtesy of California Spray-Chemical Corporation, Dept. CP, Richmond 4, California.)

Ripple trays enables crude oil unit to operate 150 percent above original design . . .

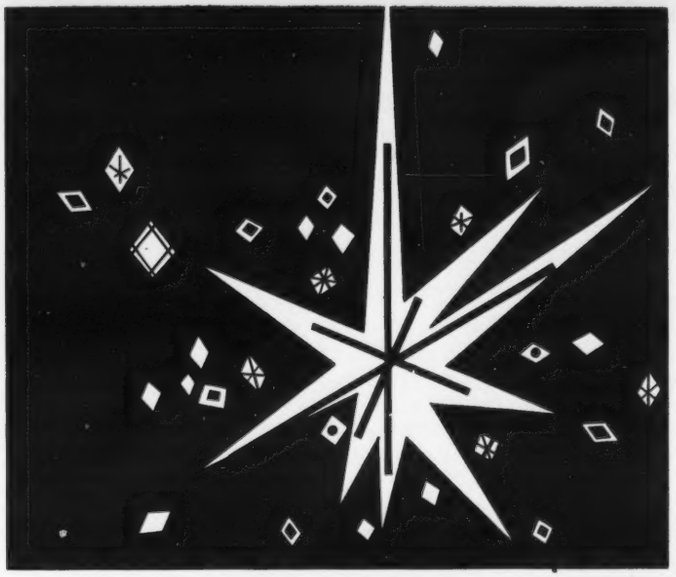
trays have self-cleaning feature, boost production from 20,000 to 31,500 barrels per day

Perforated trays, having sinusoidal-type waves pressed into them, have been developed for use in vapor-liquid contacting operations. One crude oil unit using the ripple trays has operated 150 percent above its original design. Original design capacity had been 20,000 barrels per stream day. At the increased rate of 31,500 barrels per stream day, fractionation is reported as comparable to the best obtained with former tray installations.

Advantages of ripple trays are high capacity, low cost, operating flexibility at high loads, and a special self-cleaning feature. The trays have also been used in gasoline stabilization, atmospheric and vacuum crude fractionation, ethylene-ethane splitting, acetone recovery, ether-ethanol and ethanol-water fractionation, and in other fields.

(Based on paper presented at 49th Annual Meeting of American Institute of Chemical Engineers by M. H. Hutchinson, Dept. CP, Stone & Webster Engineering Corp., 90 Broad St., New York, N.Y. and R. F. Baddour, Dept. CP, Massachusetts Institute of Technology, Cambridge, Mass.)

"This is the new miniature control and this is the instruction manual."



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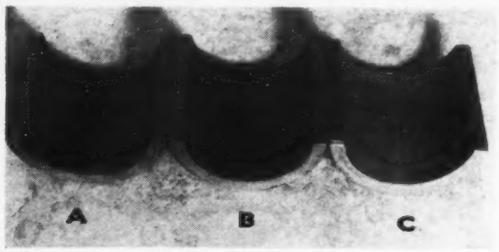
Method of removing copper from steam generators with chemicals

Procedure permits copper to be removed along with water-formed deposits

Problem: Corrosion and reduced heat transfer are caused by traces of copper deposited in large steam generating units. Galvanic cells may be formed between copper particles and exposed steel surfaces, causing pitting. Copper deposits may



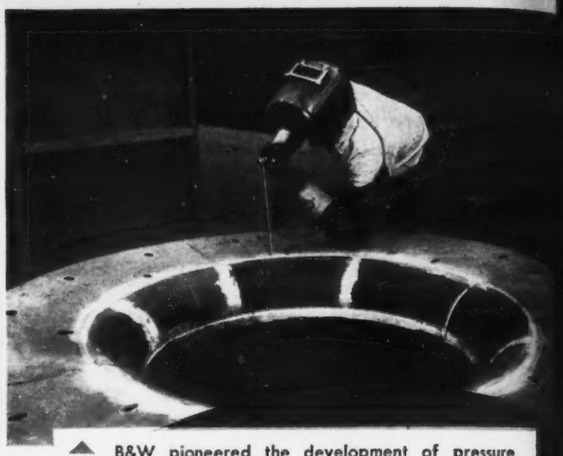
Sections of a tube cleaned with and without copper-complexing agent.
Section A shows heavy black operational deposits before tube was cleaned.
Section B was cleaned with 5% inhibited HCl. Exposure time was four hours. Note that copper is plated over entire interior of tube.
Section C was cleaned with 5% inhibited HCl solution containing copper-complexing agent. Exposure time was four hours at 150°F. Note absence of copper plating and clean appearance of metal surface

interfere with heat transfer, leading to localized overheating and sudden failure of the boiler tubes by rupture. Copper may even cause stoppage of the tubes.

Chemical cleaning has met with general approval as a method of removing deposits that accumulate in steam generators. However, although copper oxides are usually soluble in the inhibited acid solvents used in chemical cleaning operations, metallic copper is relatively insoluble. Removal of copper is usually effected with a special solvent in a separate cleaning stage. This requires additional downtime and adds to maintenance costs and lost production time.

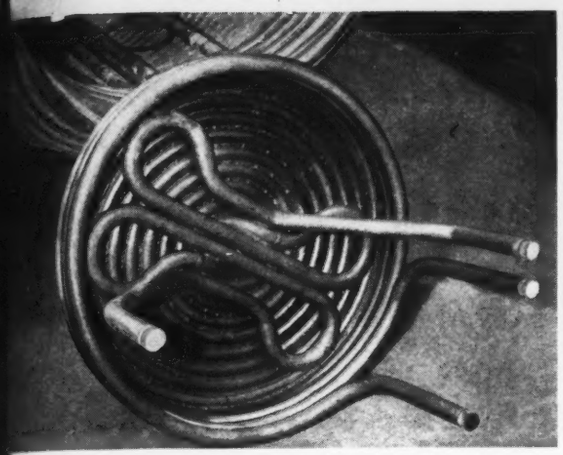
Solution: Solution to the problem was to remove the copper simultaneously with the usual water-formed deposits. Answer lay in the development of a copper-complexing agent, which was done after considerable research. Agent is now added to solvent used in a single-stage, acid-fill cleaning job. Agent has two actions: 1) it makes it possible to put metallic copper into solution; 2) it complexes copper ions so that they remain in solution in the spent acid and do not plate out on the clean steel surfaces.

▲ In the fabrication of special combination reactor and heat exchanger, thousands of feet of tubing had to be precisely wound into a helix to form a baffle. The seam of the helix was completely welded inside and out.



▲ B&W pioneered the development of pressure vessel welding. Here an experienced hand welder is working on alloy header protection plates.

Measuring peep sight coils, which are located in manway of main drum.



▲ The precision bending of tubing to form this pancake coil required unusual shop skills.

▲ Manufacture of the header protection coil involved many special techniques in bending and welding.

B&W's *Engineering and Manufacturing Skills*
Produce Something New and Different In

PRESSURE VESSELS...

Designing and manufacturing the equipment for a special combination reactor and heat exchanger for a petro-chemical plant required something unusual in the way of engineering and manufacturing skills. B&W design and manufacturing engineers contributed materially to the solution of these problems through their techniques, skills and depth of experience accumulated in producing thousands of pressure vessels, boilers, refractories, burners and tubing, of all types and for virtually every application.

The design and fabrication of this complex unit is but one example of how B&W blends engineering skills and unexcelled facilities—backing both with continuing research in many areas. Because B&W has long been meeting the special requirements of modern chemical, petroleum and steam generating operations, you will receive the ultimate in engineering and experienced craftsmanship when you bring your process equipment problems to B&W. The Babcock & Wilcox Company, Process Equipment Department, Barberton, Ohio.

BABCOCK & WILCOX
BOILER DIVISION

S-456

When inquiring check 1601 opposite last page

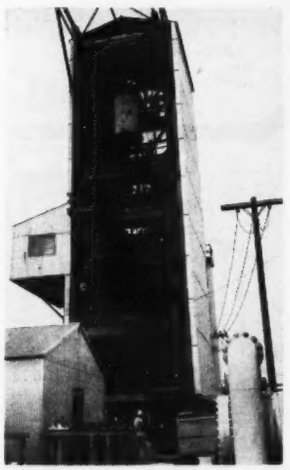
Results: Field trials have been made on eight boilers to show the efficiency of the copper-removal agent in single-fill cleaning operation. In each case, acid-exposure period was seven hours and was followed by water-flushing and a neutralizing post-boil. Inspection of these units showed clean drum interiors and tube ends. No plating of copper was observed in any of the inspections. Cleaning program should be reflected in increased operating efficiency and financial savings with reduced labor and downtime.

(For additional information on copper-removal method contact Dowell Incorporated, Dept. CP, Kennedy Bldg., Tulsa 3, Okla. . . . or check 1602 on form opposite last page.)

Air substituted for oil feed stock in petroleum pilot plant

Not a drop of oil passes through the petroleum pilot plant operated by Esso Research and Engineering Company in Linden, New Jersey. What flows through the plant is compressed air — at a rate of 8000 cfm. The air, sometimes containing trace quantities of helium, serves as an adequate substitute for oil feed stocks since the unit is aimed specifically at engineering research rather than process research.

Five stories high (45′ high 5′ diam), the reactor was built to supplement company's laboratory studies of the fluidized-solids technique of making gasoline. Powdered catalyst in fluidized bed is same as that used in commercial refining units. Reactor is built in six two-ton sections, any number of which can be removed to permit experimental changes to be made inside the vessel.



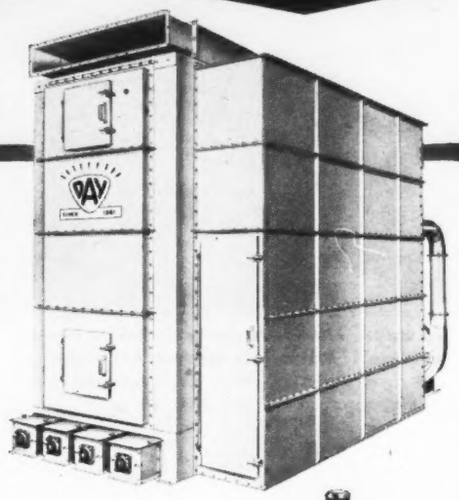
Two-ton section of reactor is hoisted into position in gasoline pilot plant

Three hoppers supply three different types of solid catalyst. More than 200 stoppered port holes stud the reactor. These are used for removing samples of air for analysis while plant is on stream. Reactor also has a five-ton crane mounted on top of it. This is used to lift the individual sections in and out of position whenever changes are made.

(Information courtesy of Esso Research and Engineering Company, Dept. CP, 15 West 51st Street, New York 19, New York.)

DUST CONTROL | **BULK STORAGE** | **PNEUMATIC CONVEYING**

DAY PRODUCTS
Serve the Chemical Industry



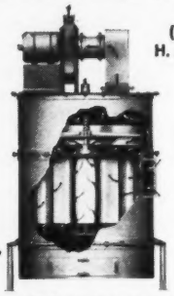
...CONTROLLING DUST

DAY "AC" Reverse-Jet DUST FILTER ● Dollar for dollar, feature for feature, you get more for your money with a DAY "AC" filter. Economical first cost and low maintenance PLUS the fact sub-assembly by DAY saves up to 75% on installation costs. ● Felted filtering media captures sub-micron dust particles with 99.99+% efficiency. Media porosity is maintained by self-adjusting, high pressure, reverse-jet blow rings. ● DAY filters occupy less floor space—need less headroom—are furnished to operate on suction or pressure. ● May be installed inside or outside; outside units completely weatherproof. **Write for Bulletin 559 for complete facts and engineering data.**

DUAL-CLONE DUST SEPARATOR

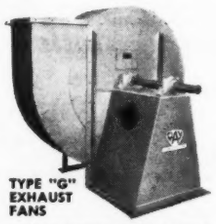
Exclusive DAY design provides high efficiency with low horsepower requirements. **Write for Bulletin 49DC.**

(Licensed by H. J. Hersey, Jr.)



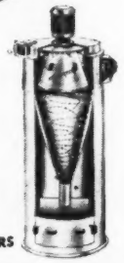
TYPE "RJ" DUST FILTER

Surge of high velocity reverse air maintains filter media porosity of this "packaged" dust filter. 99.99+% efficiency. **Write for Bulletin 560.**



TYPE "G" EXHAUST FANS

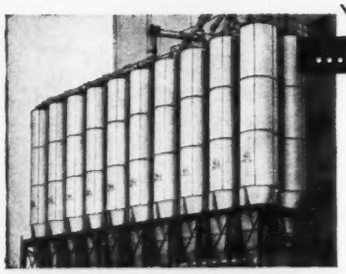
High air delivery per horsepower required. Statically and dynamically balanced; designed exclusively for dust control applications. **Write for Bulletin 471.**



DAY UNIT DUST CONTROLLERS

Complete, low cost unit combines high efficiency of DAY Dual-Clone and Exhauster. Ideal for remote locations. **Write for Bulletin 510.**

A SINGLE UNIT OR A COMPLETE DUST CONTROL SYSTEM

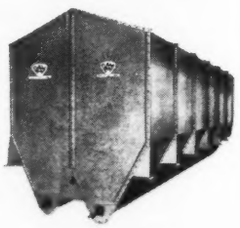


DAY Vertical Type Bulk Storage Bins

...HANDLING AND STORING BULK MATERIALS

Vertical or horizontal bins, special sizes or groups furnished to meet production needs; air lock rotary valves, twin screw feeders and other auxiliary equipment optional. DAY bins need no field riveting, soldering or welding. Built and shipped in easily erected bolted sections. **Write for Bulletins 529 and 549.**

AIR LOCK ROTARY VALVE



HORIZONTAL TYPE BULK MATERIAL BIN

INDIVIDUAL BULK EQUIPMENT UNITS OR A COMPLETE BULK MATERIAL SYSTEM

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DAY Pneumatic Conveyor equipment and systems provide a modern method of bulk material handling. Self-cleaning to prevent contamination or product deposits in system. Speed of operation improves plant efficiency. Write for details.

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Representatives in Principal Cities

When inquiring check 1603 opposite last page

Beware of low bridges!

Too large to be shipped by rail, huge 52,000-gal rubber-lined tank required special low-bed trailers and right-of-way permission to deliver it to destination. Measuring 14 ft in diam by 43 ft high, unit weighs more than 74,000 lb. Reported to be largest vacuum deaerator ever fabricated, it will be used in ion exchange system treating make-up water at new power generating station in Linden, New Jersey.

(Deaerator was rubber lined by Manhattan Rubber Division, Raybestos-Manhattan, Inc., Dept. CP, Passaic, New Jersey.)

Research underway on problem of handling sewage, wastes in space ships . . .

work initiated now in order to avoid further delay when propulsion problem is solved

Research group has been formed to investigate the problem of sewage disposal and waste treatment in space ships. Initiating the work now may avoid further delay when the major space flight problem is solved. Project is being sponsored by the Air Force.

The group will first outline factors in biology, chemistry, engineering, and physics that are fundamental to the waste handling problem. They will search literature and consult with leading scientists in many fields. They will then analyze these findings and recommend a detailed research program on one or more specific methods of handling wastes.

Here are some of the facts of life aboard a space ship:

1) Oxygen — needed to maintain human life, will be precious in the hermetically sealed ship.

2) Human wastes — perspiration, urine, feces, and carbon dioxide. These consume oxygen while they decompose.

3) The wastes are malodorous and produce

poisonous gases. When the protein in wastes decomposes, nitrogen gases are formed. Decomposing carbohydrates rob oxygen from the air to form carbon dioxide.

4) The ship's crew must live in a "closed ecological system" — an area where people must live off what is available in spite of the products of living.

5) Expelling the waste material — because of tremendous speeds, dumping anything from the ship may not be feasible. It could knock the ship off its carefully planned trajectory.

6) Conventional burning. This would consume oxygen.

Among possible avenues to solution that will be investigated are:

1) Solar energy. Solar heat bearing down on one side of the ship might be used to incinerate or to "crack" waste material. Cold temperatures in other parts could convert gaseous wastes to liquids or solids for reuse.

2) Reuse of treated wastes. Algae or similar plants might be grown as food supplement. They would also consume carbon dioxide and certain organic wastes. Other methods of growing food hydroponically (without soil) might also prove feasible. Hydroponics requires water, available from liquid wastes, and carbon dioxide from air. Oxygen liberated by plants would help enrich air.

3) Heat generated in high-speed flight might be used to burn or process wastes.

4) Filtered or chemically treated wastes might be used as supplemental fuel in ship's propulsion system.

Some of the factors that the group will investigate are: 1) amount of water removed by freezing at very low temperatures, 2) effects of chemical catalysts in recovery of oxygen, 3) percentage of moisture in bodily discharges, 4) nature and composition of outer atmosphere, 5) use of thermal processes to crack bodily wastes, and 6) amount of heat needed for evaporating various materials.

(Research work is being conducted at Research Division, NYU College of Engineering, Dept. CP, New York, New York.)

Are you a VIP?

If so, don't miss page 81!

Space Requirements

Eight Allis-Chalmers Units Do Same Job Formerly Done by Sixteen Electro-Magnetic Screens in Large Chemical Plant

IN THIS installation — as in most plants where screening is done — two factors make this remarkable achievement possible. (1) The stacked-deck design of the Allis-Chalmers stainless steel gyratory screen provides up to 35 square feet of screening area in just 16 feet of floor space. (2) The gentle but thorough gyratory action provides maximum capacity by exposing product to entire screening area.

Noise Level Greatly Reduced — The comparative quietness of the Allis-Chalmers gyratory screens was apparent as soon as they were installed. In these units, a dynamically balanced mechanism assures quiet, vibrationless performance. Operating economy (low power requirement) was another advantage gained in the change to A-C screens.

Improved Quality Control — In addition to top screening efficiency and economy, this newest and finest of mechanical screens is built to give you profit-insuring quality control and quick, sanitary, simplified maintenance. Get the complete story. Contact your nearby Allis-Chalmers representative or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin. Ask for Bulletin 07B8446.

A-C ALLIS-CHALMERS

When inquiring check 1604 opposite last page

Now! Make 90° bends in 3" pipe in one pass

It's Easy — with the New BLACKHAWK FEATHERWEIGHT hydraulic pipe bender!

Now you can make factory-like bends with ease using BLACKHAWK's super-portable 103-pound ALUMINUM BENDER. Features easy-on easy-off Top Plate — "Optik-Angle" bend gauge — 13-inch stroke ram. Users report Blackhawks with electric-powered hydraulic pump pay for themselves in only 35 bends — save up to 75% over cost of manufactured ells. See your supply house now for this Blackhawk featherweight and for other Porto-Power kits to bend ½" to 2" thin wall conduit and 1" to 4" rigid pipe. Only 3 quick settings needed for 3½ and 4" bends!

BLACKHAWK®

BLACKHAWK MFG. CO., Dept. P-6827 Milwaukee 46, Wis.

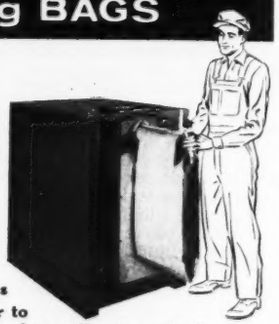
When inquiring check 1608 opposite last page

CUT COSTS for Packing BAGS

FILL and WEIGH with

CODDINGTON

AUGER-MATIC Bag Packer



Low Cost, portable AUGER-MATIC packs any material from powder to pellets in paper bags . . . shuts off automatically when desired weight is reached.

Valve bags fit snugly on AUGER-MATIC spout so no dust escapes . . . keeps bags clean . . . eliminates costly tieing or bag closing equipment.

--------FILL OUT AND MAIL TODAY--------

E. D. CODDINGTON MFG. CO.
5036 N. 37th Street, Milwaukee 9, Wisconsin

Please send me facts on Cutting Valve Bag Packing Costs

MY NAME.....

COMPANY.....

ADDRESS.....

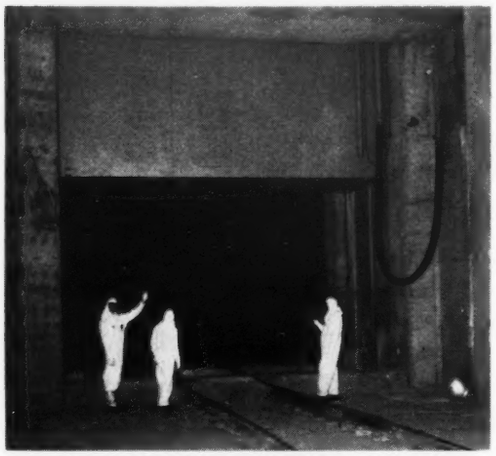
CITY.....ZONE.....STATE.....

When inquiring check 1609 opposite last page

Tunnels provide safe storage for radioactive-contaminated nuclear equipment . . .

will hold twelve loaded flat cars; entrance sealed by water-filled concrete barrier gate

Large concentrators and other pieces of heavy atomic apparatus, worn out or too "hot" to be repaired, are being stored safely inside a 500-ft tunnel at the AEC's Hanford, Washington, plutonium plant. The tunnel, 19 feet high and 23 feet wide, is outfitted with a spur railroad track.



Burial tunnel for radioactive contaminated equipment will hold 12 loaded railway cars

Heavy atomic apparatus can be loaded aboard a railroad flat car and moved into the tunnel. Once inside, the car and its contaminated cargo can be entombed forever, or until the time that it is deemed safe for removal. Tunnel will hold 12 loaded railway cars. Entrance is sealed by a massive water-filled concrete radiation-barrier gate. Less cumbersome equipment which can be readily dragged or lifted from flatcars is buried out in the desert wastelands which surround the plant. Plant is operated by General Electric Company for AEC.

(Information courtesy of General Electric Company, Dept. CP, Schenectady 5, N.Y.)

Catalogs photographic equipment for field, studio, and darkroom

More than one thousand photographic items for use in the field and in industrial photo studios and darkrooms are illustrated and described in this 96-page catalog. Just about everything the professional needs is here. List prices are given.

Cat 1055-L is issued by Burke & James Inc., Dept. CP, 321 S. Wabash Ave., Chicago 4, Ill. When inquiring check 1610 on form opp. last page.

Adjustable conax® PIPE CLAMP THERMOCOUPLE

for accurately reading outside pipe temperatures

advantages

- Used wherever immersion thermocouples are impractical or undesirable
- Used where extreme corrosion and erosion are problems
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Thermocouples available in Copper-Constantan for low temperatures or Iron—Constantan and Chromel—Alumel up to 1000° F.

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When inquiring check 1611 opposite last page

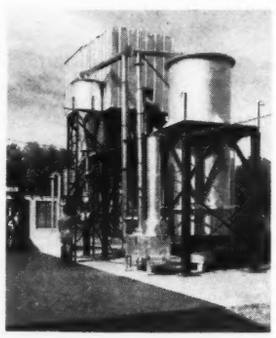
alphabetical index on page 221

. . . for alphabetical index of all processes, materials, services, and equipment discussed in this issue's editorial columns and advertisements, turn to page 221. "Quick-locator" starting on that page was a feature in **CHEMICAL PROCESSING** years ago. It means extra work for the Editors, but it helps you, the reader, in finding what you want . . . in a hurry!

Nuclear symposium will cover nondestructive test methods

Three-day symposium has been scheduled for April 16, 17, and 18, 1957, to cover the subject of nondestructive tests in the nuclear field. Information resulting from 15 years research and development will be presented for those interested in applying the methods to industrial applications. Papers will be divided into three groups: 1) reactor materials, 2) completed fuel assemblies, and 3) miscellaneous. Symposium is being sponsored jointly by the American Institute of Chemical Engineers, The American Nuclear Society, the American Society for Testing Materials, and the Society for Non-Destructive Testing. It will be held at the Morrison Hotel, Chicago, Illinois.

(Information courtesy American Society for Testing Materials, Dept. CP, 1916 Race Street, Philadelphia 3, Pa.)



Fluid bed reactors

. . . of four foot diameter have been installed at pilot plant laboratory of Battelle Institute, Columbus. Two reactors can roast ore in one or two stages in either oxidizing or reducing atmospheres. They accept either slurry or solid feed.

For more information on product at right, specify 1612 . . . see information request blank opposite last page.

FOR CATALYTIC REFORMING

4 B&W Refractory Castables with low iron content

B&W Kaocast

Ten years ago, B&W introduced this 3000° castable which offers a combination of high temperature use limit, as well as very low iron content. B&W Kaocast can either be gunned or cast in place.

B&W Kaocrete-LI

After two years of extensive field service, B&W adds Kaocrete-LI to low iron content castables. B&W Kaocrete-LI, which has an iron content of less than 1%, has exceptionally high strength for resistance against abrasion and erosion. It has sufficient refractoriness for use at temperatures to 2700 F. Suitable for both gunning and casting.

B&W Kaolite-LI

Another new castable with over two years of field service, B&W Kaolite-LI has high insulating properties due to its light weight (only 59 pounds per cubic foot). Its iron content is also less than 1%. It is designed to be applied with a cement gun only. Installation and maintenance time can be cut since Kaolite-LI does not require water curing and heat can be applied directly after gunning.

B&W Kaocrete-32

Developed for special high temperature service, B&W Kaocrete-32 has extremely high strength and a use limit of 3200 F. It can be poured, plastered or gunned into place.

Properties of B&W Low Iron Content Castables

		B&W Kaocast	B&W Kaocrete LI	B&W Kaolite LI	B&W Kaocrete 32
Use limit, °F		3000	2700	2300	3200
Melting point, °F		3200	3100	2700	3297
Average density lb/cu ft after firing		126	131	59	134
Average % Fe_2O_3		1.0	0.9	0.8	1.0
Cold crushing strength—psi average—after heating for 5 hrs. at:	1000 F	700	2500	350	1000
	1500 F	500	2500	350	800
	2000 F	400	1200	300	750
	2200 F	500	1300	450	1000
	2400 F	500	1600	—	2000
	2600 F	1000	6000	—	3000
	2800 F	2200	—	—	3500
	3000 F	3500	—	—	4000
	3200 F	—	—	—	5000
Permanent linear shrinkage—average % less than—after heating for 5 hrs. at:	1000 F	0.3	0.2	0.3	0.2
	1500 F	0.3	0.2	0.4	0.2
	2000 F	0.5	0.2	0.4	0.2
	2200 F	0.5	0.2	0.6	0.4
	2400 F	0.5	+0.1	—	0.5
	2600 F	0.5	—	—	0.5
	2800 F	0.5	—	—	0.5
	3000 F	0.3	—	—	0.2
	3200 F	—	—	—	0.1

Consult your B&W Representative for additional information on these and other B&W Refractories for the refining industry.

B&W REFRACTORIES PRODUCTS: B&W Allmul Firebrick • B&W 80 Firebrick • B&W Junior Firebrick • B&W Insulating Firebrick • B&W Refractory Castables, Plastics and Mortars • B&W Silicon Carbide

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REFRACTORIES DIVISION
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WORKS: AUGUSTA, GA.

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Materials

HANDLING EQUIPMENT

Engineered and Built to meet your needs

CONTROLLED PRECISION DUMPING or POURING

DRUM and BARREL TILT

Especially ideal for handling chemicals, solvents, powders, etc. Unit for handling carboys also available. Equipped with two safety type locking devices and all steel, welded yoke. Turns 360° through worm drive. Hand-operated chain drive or 12" O.D. hand wheel.

Item B-731
$217.50

LOADING and UNLOADING TRUCKS

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$20.15

DRUM and BARREL SLING

Handles drums, barrels, kegs that have a lip. Excellent for handling draining of drums. Heavy welded chain and forged grab hooks. Weight approx. 8½ lbs.

CONVENIENT, SAFE HANDLING of LIQUIDS with

Combination TRUCK and DRAIN RACK loads automatically

DETACHABLE HANDLES

Item NS 506 DH (detachable handles)
$61.80

Item NS 506 (handles welded to frame)
$57.35

This dual purpose truck can be used to move barrels or drums and also serve as a drain rack. Available in two styles—handles welded to frame or with detachable handles that can be pulled out to conserve floor space. One set of handles can serve any number of trucks. Sturdy welded construction. Free-rolling 8" roller bearing wheels. Weight approximately 90 lbs.

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Palmer-Shile Co.

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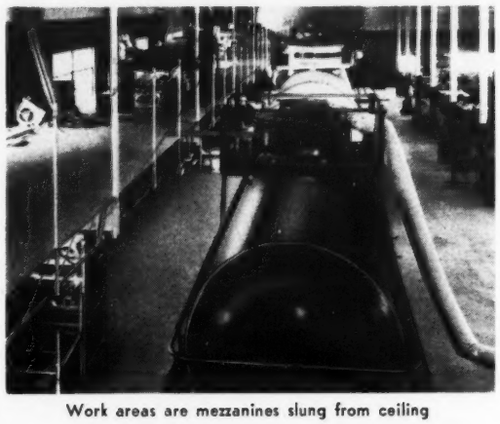
When inquiring check 1613 opposite last page

Plant uses mass production methods for rubber lining railway tank cars . . .

cars move along assembly line on heavy-duty conveyor; plant can handle up to ten at a time

In an attempt to break the transporation bottleneck caused by lack of rubber-lined tank cars, a plant has been built exclusively for the job of lining these carriers. Using mass production methods, facility can handle up to ten cars at a time.

Located at Schoolcraft, Michigan, plant housing assembly line is 60 feet by 240 feet with a working height of 26 feet. There are super-bomber hangar-type doors at both ends to permit continuous movement of cars on an assembly line basis. Building has two spur tracks running through it. Each has a capacity of five cars.



Work areas are mezzanines slung from ceiling

Lining the tank cars involves five operations. First, interior of car is cleaned by blasting with steel grit under compressed air. Next, car is given four coats of cement (first coat for adhesion to steel, second and third coats for "build-up", and special-blend

(*Please turn to page 79*)

Third operation consists of applying rubber panels to car's cemented surfaces

Would you like to receive CHEMICAL PROCESSING personally?

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If you are responsible for processing operations in an administrative capacity as plant superintendent, chemical engineer, chemist, engineer or equivalent responsibility . . . in a plant of substantial operations* where chemical processing is an important factor . . . CHEMICAL PROCESSING will be sent to you without charge or obligation if you request it. Use form below. In requesting, be sure to answer all questions. If your firm is not rated or listed in standard references, indicate size of the company by capacity, annual sales or number of employees. Unless all information is given, magazine will not be sent.

*"Substantial operations" does not necessarily mean an extremely large plant. But requests for the magazine exceed supply so we must set standards to insure publication being sent where it can be used to best advantage.

CHEMICAL PROCESSING
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City _____ Zone _____

State _____

Main Products _____

XTENDED SURFACE VELL ACCEPTED N FACT AND THEORY

creased heat transfer effectiveness, be-use of the greater surface area realized rough the use of fins, is a well estab-hed principle. In recent years its use s become increasingly widespread be-use of Wolverine Tube's development condenser tubing with fins actually truded from the tube wall.

The further development of Trufin pe S/T, with 19 fins per inch, has per-itted extended surface to be applied, the first time, to conventional shell d tube heat exchangers. Equally im-rtant is the fact that it is as easy to use plain tube. Here's why:

The fins are spirally extruded from ick-walled tube to a height of approx-ately 1/16 of an inch. The extrusion ocess produces a smooth fin develop-nt without any sharp angles or crev-s. Tube ends are left without fins and e tube is designed so that the O.D. of e plain end is slightly greater than the D. over the fins. This permits it to be erted into bundle and rolled into the be sheet in the regular manner.

Because the fins are part of the tube lf they are little affected by excessive bration, thermal shock or varying essures.

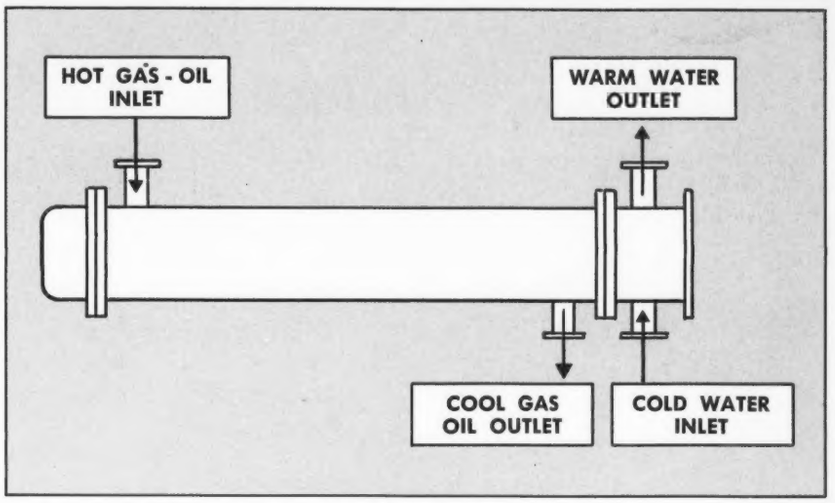
For complete information about olverine products and services write your copy of the Wolverine Con-nser Tube Book.

RITE FOR FREE BOOK

luable design information, actual case tories and descriptions of Trufin plications are all contained in olverine's Trufin Opportunity Book.

This valuable book is one of the most mprehensive ever compiled on the use extended surface condenser tube and be of great help as a reference book processing engineers.

The Trufin Opportunity Book is ilable without charge. Write for your py–TODAY.



Trufin Type S/T Scores Again!

120% BOOST IN HEAT TRANSFER SERVICE UPS HEAT DUTY AND ON STREAM TIME

By Ernest Dodd

There's no doubt about it. In the east, west, north and south, word is spreading fast about the amazing results obtained when using Wolverine Trufin® Type S/T condenser tube in various heat transfer applications.

This time, it's a refinery in the mid-west reporting—telling of a retubed heavy gas oil cooler using water as the coolant. Heat transfer was increased, cooling oil outlet temperature was dropped 10° to 15°F. and on-stream time stepped up 350%!

How does Trufin Type S/T accomplish these outstanding performance boosts? The answer isn't hard to find.

Type S/T is an extended surface tube specifically designed for shell and tube heat exchangers. Because of its integral fins – they're actually a part of the tube wall—Type S/T has approximately 2½ times more heat transfer surface than does plain tube. The result is more BTU's from each foot of tube. In this case, for example, the oil cooler, when tubed with plain tube had a total of 275 ¾"O.D. x 16 BWG x 16' long Admiralty tubes. When retubed with Trufin Type S/T, exactly the same number of tubes—275—of the same O.D., alloy and length were used. There was, however, one startling difference.

The oil cooler unit tubed with prime surface tube had 865 square feet of heat transfer surface. WHEN RETUBED WITH TRUFIN TYPE S/T, OUTSIDE TUBE SURFACE AREA JUMPED TO 1930 SQUARE FEET—AN INCREASE OF 120%. In those figures lies the answer to Trufin's success.

Wolverine Trufin available in Canada through the Unifin Tube Company, London, Ontario.

CALUMET & HECLA, INC.
CALUMET DIVISION
WOLVERINE TUBE DIVISION
FOREST INDUSTRIES DIVISION
GOODMAN LUMBER COMPANY
CALUMET & HECLA OF CANADA LIMITED
CANADA VULCANIZER AND EQUIPMENT COMPANY LIMITED

WOLVERINE TUBE

Division of Calumet & Hecla, Inc.
1469 CENTRAL AVE., DETROIT 9, MICH.

Manufacturers of Quality-Controlled Tubing and Extruded Aluminum Shapes

Plants in Detroit, Michigan, and Decatur, Alabama. Sales Offices in Principal Cities

EXPORT DEPT., 13 E. 40TH ST., NEW YORK 16, N.Y.

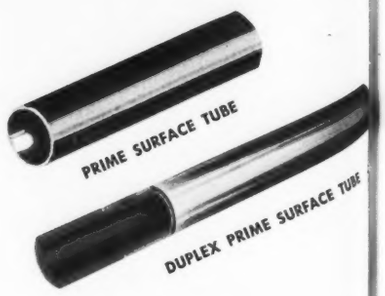
RELIABLE CONDENSER TUBES
by Wolverine Tube

IN THESE POPULAR ALLOYS . . .

PRIME SURFACE TUBE
Inhibited Admiralty
Copper
Cupro-Nickel 10, 20, 30%
Aluminum Brass
Red Brass
Aluminum

DUPLEX PRIME SURFACE TUBE
Can consist of an inner and outer tube formed from any of the above metals.

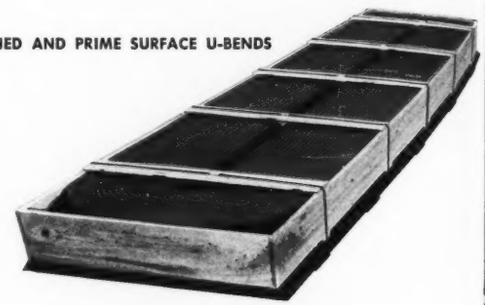
IN ALL THESE TYPES



FINNED AND PRIME SURFACE U-BEND TUBES

Inhibited Admiralty
Copper
Cupro-Nickel 10, 20, 30%
Aluminum Brass
Red Brass
Aluminum
When specifying in finned form add electric-welded steel to above list.

FINNED AND PRIME SURFACE U-BENDS



FINNED TUBE

TRUFIN TYPE S/T
Copper—70-30 Cupro-Nickel—90-10 Cupro-Nickel
85-15 Red Brass—Admiralty—Electric-Welded Steel
Aluminum Brass

DUPLEX TYPE S/T
Also available in above metals

TRUFIN TYPE H/A
Copper-Aluminum

TRUFIN TYPE H/R
Copper-Aluminum

TRUFIN TYPE W/H
Copper-Cupro-Nickel

Wolverine Trufin available in Canada through the Unifin Tube Company, London, Ont.

CALUMET & HECLA, INC.
CALUMET DIVISION
WOLVERINE TUBE DIVISION
FOREST INDUSTRIES DIVISION
GOODMAN LUMBER COMPANY
CALUMET & HECLA OF CANADA LIMITED
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WOLVERINE TUBE
Division of Calumet & Hecla, Inc.
1469 CENTRAL AVE., DETROIT 9, MICH.
Manufacturers of Quality Controlled Tubing and Extruded Aluminum Shapes

PLANTS IN DETROIT, MICHIGAN, AND DECATUR, ALABAMA. SALES OFFICES IN PRINCIPAL CITIES.

(*Continued from page* 78)

final coat for proper adherence of rubber lining). Third operation consists of lowering the sheet rubber into car for application to cemented surfaces.

Curing of rubber linings is done by use of steam which contributes to aging and conditioning of rubber for all types of chemical contact. Final operation consists of complete and thorough inspection. Interior of car is examined with a specially developed electrical detector which "sparks" when bare metal is encountered.

To expedite work, plant has mezzanines built at tank-top level, with cat walks leading to dome platforms on the cars. Rubber lining, prior to application, is prepared on warming and cutting tables next to the dome openings. Cars are moved from station to station by heavy-duty floor conveyor, eliminating need for winches and other conventional marshalling equipment.

(Tank car lining plant is owned by Automotive Rubber Company, Inc., Dept. CP, 12550 Beech Road at PMRR, Detroit 39, Michigan.)

Summarizes deodorization process for fats and oils

Data sheet discusses continuous deodorization process for fats and oils. Six advantages of the process are listed. Utilities requirements per thousand pounds of deodorized oil are also presented. Flow diagram is included.

Data sheet on continuous deodorization process for fats and oils is issued by Blaw-Knox Company, Chemical Plants Division, Dept. CP, Pittsburgh 30, Pa. Specify 1614 opposite last page.

Heat transfer reviewed in color film

Heat transfer is the topic of 22 minute Kodachrome sound, film. Film stresses importance of uniform and precise temperature control in various production processes in the 400-750°F temperature range. Presenting a brief review of direct fire, liquid phase, and vapor phase heating methods, film concentrates primarily on Dowtherm vapor-phase heating.

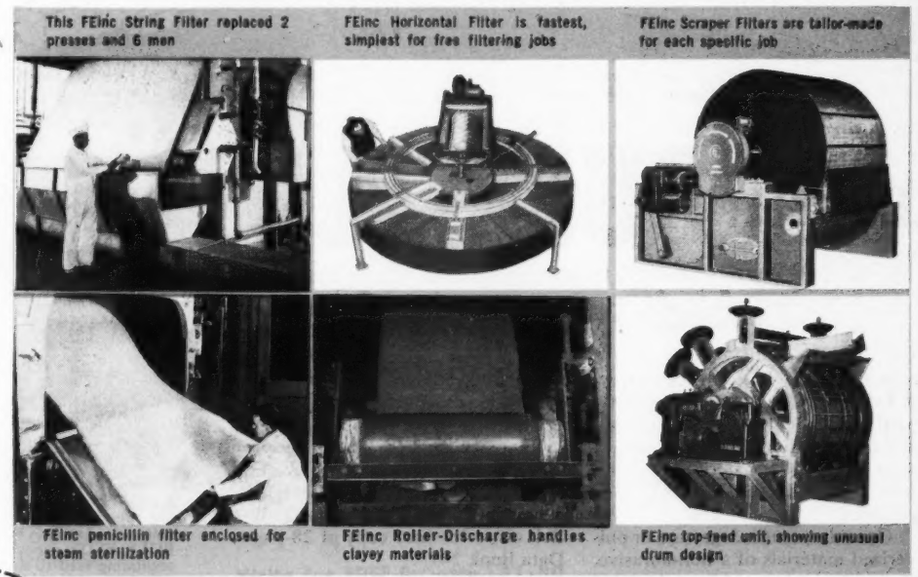
"Heat Transfer—400-750°F" may be obtained for free showings by writing to The Dow Chemical Company, Public Relations Department, Dept. CP, Midland, Michigan.

For more information on product at left, specify 1615 . . . see information request blank opposite last page.

CUSTOM DESIGNED FILTRATION

Get the last ounce of efficiency, at no extra cost ...it adds up to big savings

When your filter runs hour after hour . . . month after month . . . a few points extra efficiency soon pays back the cost of the finest machine you can buy. There's only one sure way to get this last ounce of efficiency: *custom design*. In all types of rotary vacuum filters, FEinc's *custom design* has consistently delivered whatever is required. Whether you want higher recovery of valuable solubles with less dilution . . . lower impurities in finished cake . . . 2-6% less moisture . . . or just higher output in limited floor space . . . FEinc can deliver. We'll be happy to conduct complete tests and submit recommendations. No obligation. Write today.


This FEinc String Filter replaced 2 presses and 6 men
FEinc Horizontal Filter is fastest, simplest for free filtering jobs
FEinc Scraper Filters are tailor-made for each specific job
FEinc penicillin filter enclosed for steam sterilization
FEinc Roller-Discharge handles clayey materials
FEinc top-feed unit, showing unusual drum design

FEinc

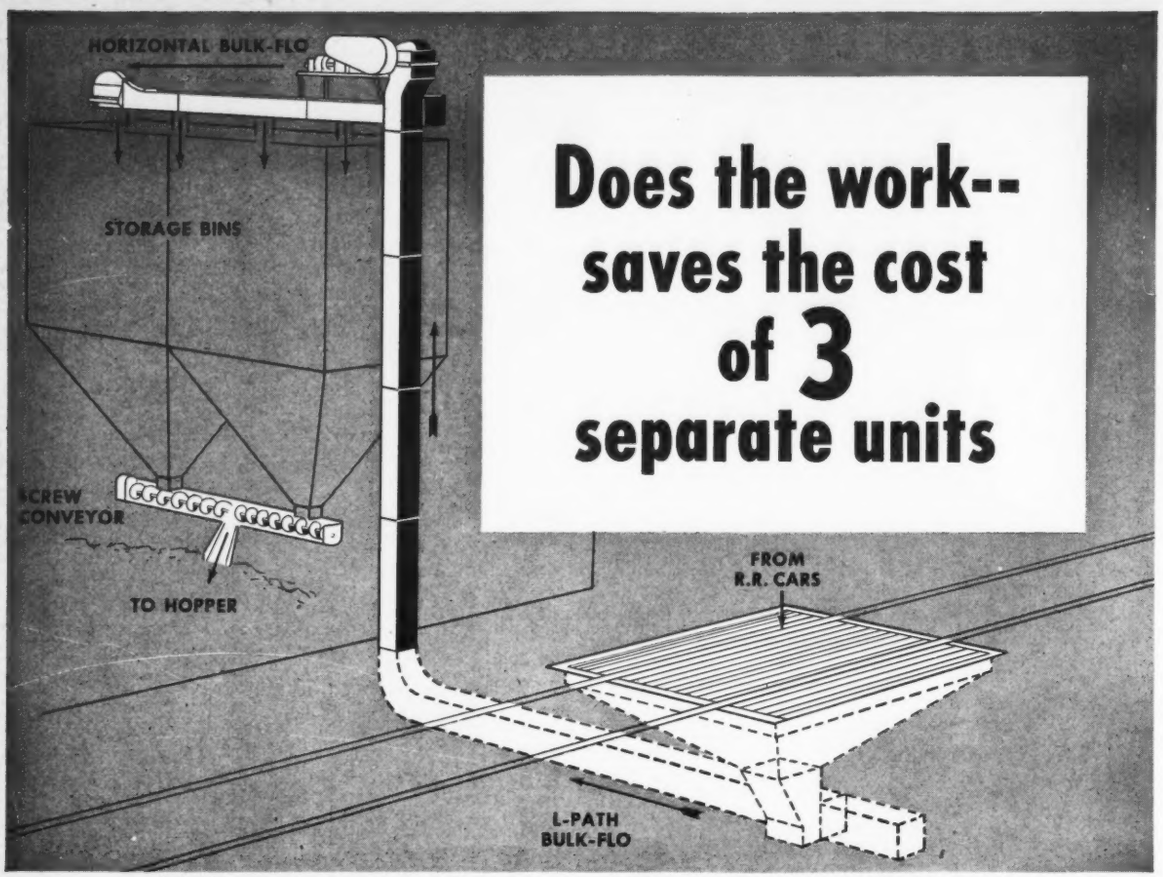
FOR A BIGGER YIELD

FILTRATION ENGINEERS, INC.
SUBSIDIARY OF AMERICAN MACHINE & METALS, INC.
155 Oraton Street, Newark 4, N. J.

50

Custom designed continuous filtration

When inquiring check 1616 opposite last page



Does the work-- saves the cost of 3 separate units

Bulk-Flo conveyors carry material from railroad cars to storage bins. Horizontal run of L-path unit is below ground level and vertical lift delivers to a horizontal Bulk-Flo on the roof.

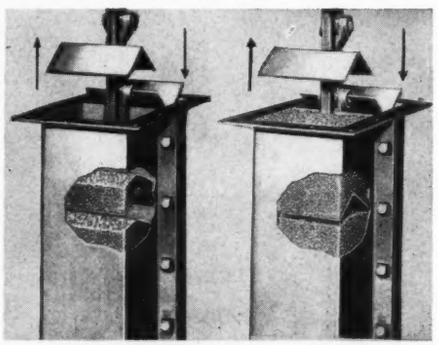
LINK-BELT BULK-FLO

feeds • conveys • elevates

HERE's a single, compact conveying medium that combines three vital functions. It's the Link-Belt self-feeding Bulk-Flo that moves a wide variety of materials horizontally, vertically, on an incline, or combinations of all three.

Granular, crushed, ground or pulverized materials of a non-abrasive, non-corrosive nature are handled gently in individual self-clearing compartments. Even friable materials are safely conveyed . . . with a minimum of breakage, degradation, dusting or contamination. Two basic styles are available—one for lumpy materials, the other for free-flowing materials.

There's a wide range of designs that can be engineered to match your system requirements. For complete information ask your Link-Belt office for your copy of 28-page Data Book 2475.



Partially or fully loaded, BULK-FLO provides positive, gentle movement of material. Unlike conventional designs, BULK-FLO's capacity can be varied by regulating feed to meet demand changes.

LINK-BELT

BULK-FLO FEEDERS • CONVEYORS • ELEVATORS 14,004

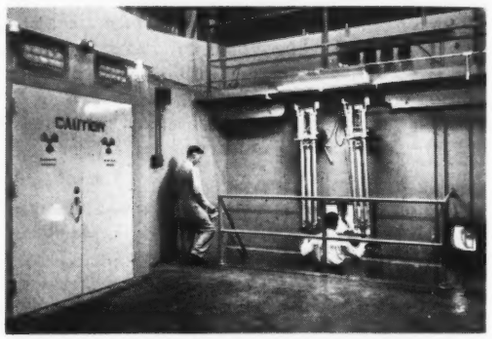
LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

When inquiring check 1617 opposite last page

Privately owned plant fabricates radioactive sources in strengths up to 10,000 curies

A new plant for fabricating extremely strong radioisotope sources under license by the AEC has gone into operation. Believed to be the first commercial facility in this country capable of fabricating radioisotopes in strengths up to 10,000 curies, the plant is located in Philadelphia.

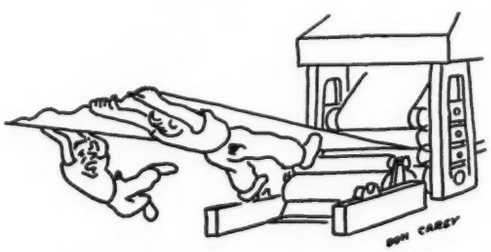
Basically, equipment consists of a heavily-shielded



Radioisotope-handling facility is housed in room with 4'-thick walls of high-density concrete. Closed-circuit television (right) permits close observation of work being done inside "hot" cell

"hot" cell, a master-slave manipulator, a 36"-thick high-density glass shielding window, closed-circuit television, and miscellaneous equipment. Fabrication is accomplished by building up — in wafer, pellet, rod, or other forms — cobalt-60, cesium, thulium, iridium, and other isotope materials. Final product is encapsuled in specially designed containers for shipment and storage.

(Radioisotope facility is part of Nuclear Systems Division, the Budd Company, Dept. CP, 2450 Hunting Park Avenue, Philadelphia 32, Pa. . . or check 1618 opposite last page.)



"Better cut back on the starch, Joe!"

Don Carey works for National Container Mill Division, Owens-Illinois Glass Co., Valdosta, Ga.

Every month thousands of Very Important Processing Persons, like yourself, prove they are reading CHEMICAL PROCESSING.

How's that? Is this so much "loose talk"?

No . . . that statement is solidly based on an audit of *known* readers—an *actual check* of readers who, in search of specific information to meet their specific needs, used the Reader Service Slip, that convenient form opposite the last page of each issue.**

Consider the facts as tabulated below . . . that 14,128 product requests were made by 2770 *different* persons in one of our smaller issues. More than 90% of these folks are processing people employed by manufacturing companies using chemical processing techniques. And more than 78% of these people work for firms having a capital rating of over $1,000,000.

Titles	*Percentage in Each Title Classification*
Presidents, Vice Presidents, Other Corporate Officers, Owners, Partners, Executives	2.5 %
Works Executives, Superintendents, Plant Managers and Assistants	9.5
Supervisors, Department Heads, Foremen and Assistants	9.2
Technical Directors, Directors of Research, Chief Chemists, Chief Metallurgists and Assistants	6.5
Other Chemists, Metallurgists, Technologists and Assistants	14.3
Engineers: Chief, Chemical, Process, Plant, Production and Assistants	48.2
Purchasing Agents	0.7
TOTAL REQUESTS FROM INDUSTRIAL PROCESSING PEOPLE	90.9
Independent Consultants and Testing Labs	2.7
Government: Federal, State, Municipal, Military, Naval	2.9
Miscellaneous: Librarians, etc.	2.4
Title Not Given	1.1
GRAND TOTAL (2770 persons **known to read** the issue)	100.0

Naturally we are proud of this evidence of high readership and use of CP, for our job is to serve you key processing folks by giving you, month after month, information that you will read and profit by.

How can we serve you better? We welcome your suggestions and your comments.

THE EDITORS
OF CHEMICAL PROCESSING

**Of course, this audit of *known* readership does *not* include readers who do *not* use the Reader Service Slip, but who *do* correspond directly with our editors or manufacturers of the service, equipment or material discussed. Nor does it include thousands who read but do not contact the publisher or manufacturers.

Handle Sticky Materials
Without Buildup on Rolls!
UNIQUE BELT CONVEYOR IDLER
Flexing action of the Joy Limberoller conveyor idler keeps it free of material buildup . . . keeps maintenance to an unheard-of-low.

Belt conveyor maintenance can be a real headache when sticky chemicals and fertilizers start gumming up the idlers. The unique Limberoller belt conveyor idler is completely flexible—made of resilient molded neoprene discs on a flexible steel cable. This flexing action breaks loose any material building up on the rolls—makes maintenance dive 30% to 90%.

The Limberoller has already given over *12 times the service life* of conventional idlers in many applications—proved extremely effective in handling triple superphosphate, ammonium sulphate, and sticky fertilizers.

The Joy Limberoller also resists dust, abrasion, and corrosion . . . no bearing trouble because only two bearings are used and these are up out of the dirt zone. Get details from *Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.* In Canada: *Joy Manufacturing Co. (Canada) Limited, Galt, Ontario.*

Write for FREE Bulletin 131-80

Consult a Joy Engineer

For Air and Gas Compressors, Vacuum Pumps and Boosters, Conveyors, Fans, Electrical Connectors, Oil-Free Compressors.

WSW 1-6319-131

JOY

SINCE 1851 . . . OVER 100 YEARS OF ENGINEERING LEADERSHIP

When inquiring check 1619 opposite last page

Plant converts spent acid from steel mill operations into H_2SO_4 and Fe_2O_3

Pilot plant is now in operation at Niles, Ohio, for converting waste acid from steel mills into useful products. Costing about a half-million dollars, plant uses Blaw-Knox Ruthner process, conceived

Robert H. Ferguson, chairman of sponsors' committee, turns first valve in pilot plant. Process superintendent, Thomas F. Barnhart, is at left

by Othmar Ruthner, an Austrian scientist, shortly after World War II. Operation converts spent sulfate liquors into sulfuric acid and iron oxide.

Process represents the steel industry's latest approach to a problem which has stubbornly resisted years of study and research. Pilot plant is sponsored by Blaw-Knox Company, Jones & Laughlin Steel Corporation, National Steel Corporation, Pittsburgh Steel Co., Republic Steel Corporation, United States Steel Corporation, and Youngstown Sheet & Tube Company.

(Development work for adapting process to American standards was conducted by Blaw-Knox Company, Dept. CP, Pittsburgh 30, Pa.)

Plastic envelopes

Transparent acetate envelopes for various industrial uses are reviewed in catalog. Information about dozens of different styles and sizes is included.

"Transparent Acetate Envelopes for Industry" is issued by American Kleer-Vu Plastics, Inc., Dept. CP, 53-06 Grand Ave., Maspeth 78, New York. Specify 1620 opposite last page.

what more can you get out of organophosphorus derivatives?

That's a hard question to answer, for at Victor *some people never let well enough alone*. Some of our best people, too.

For example, look what happens to a new intermediate like chloromethylphosphonic dichloride when restless research chemists work on it. A condensation here . . . a hydrolysis there . . . and a whole series of new products results. Some of the ideas our chemists put to work themselves to provide us with a complete line of chloromethylphosphonic compounds.

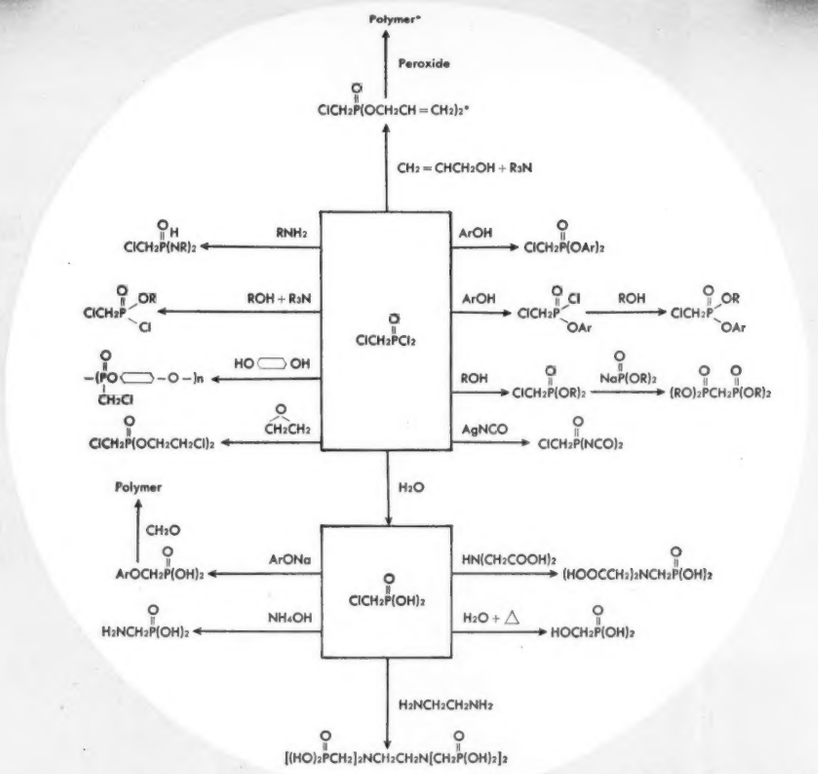
Perhaps *you* can find other uses for the reactive chlorine atoms, the carbon-to-phosphorus bond, and the stable alpha-chlorine . . . the host of reaction possibilities Victor chloromethylphosphonic compounds present.

If *you're* looking for new ways to improve products, adapt them to new markets, one of these compounds may be just right for you.

Pilot Plant Quantities . . .

Pilot plant quantities of the dichloride, the acid, and the dipropyl, dibutyl, and dioctyl esters are available. Fill in the coupon below for research samples or data.

available. Fill in the coupon below for research samples or data.



*U. S. Patents 2,714,100 and 2,735,789

VICTOR CHEMICAL WORKS CP-2

155 N. Wacker Drive
Chicago 6, Illinois

Please send me ☐ samples ☐ data sheets for the Victor chemicals checked below:

☐ Chloromethylphosphonic dichloride
☐ Chloromethylphosphonic acid
☐ Dipropyl chloromethylphosphonate
☐ Dibutyl chloromethylphosphonate
☐ Dioctyl chloromethylphosphonate

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ ZONE ____ STATE _____

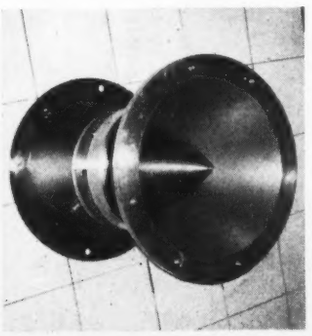
If You Can't Leave Well Enough Alone where you are now . . . and are a chemical engineer, sales engineer, or chemist . . . you'll probably discover some *new* reactions to your problems when you see Victor. It pays to, you know. For information, write to: Victor Chemical Works, Technical Personnel Division, 155 N. Wacker Drive, Chicago 6, Illinois.

VICTOR
Dependable Name in
Chemicals
for 59 Years

IDEAS

Ultrasonic device may solve fog problem

The problem of fog dissipation on airports and highways may be solved by the use of an ultrasonic device. Currently being used in Europe as a high-intensity source of sonic energy ranging from 4 to 40 kilocycles, its application for fog dissipation is being investigated by the French inventor, Dr. Raymond Boucher, under sponsorship of the French Air Force.



Ultrasonic device can be operated at temperatures up to 700°C

Unit also holds promise of improving industrial processes such as radioactive waste disposal, concentration of fissionable ores, precipitation of aerosols and dust particles, cleaning, sterilization, and mixing of paints. Device can be operated on either gas or liquids. It may also be used in corrosive atmosphere and in temperatures as high as 700°C.

Unit has no moving parts or electronic components. An air compressor or conventional steam generator furnishes the driving power, which is converted to ultrasonic energy with an efficiency greater than 20%.

(Multiwhistle RD Air-Jet ultrasonic generator is manufactured in the US by Gulton Industries, Inc., Dept. CP, 212 Durham Avenue, Metuchen, New Jersey. Check 1621 on form opposite last page.)

For more information on product at left, specify 1622 . . . see information request blank opposite last page.

Emission spectrometer in use for testing lube oil additives at every stage of production gives —

CLOSE PROCESS CONTROL WITH SPEEDY LABORATORY

GORDON WEYERMULLER, Associate Editor
With **C. L. JARREAU,** Technical Service Chemist
And **L. J. TRUE,** Operations Planner
Oronite Chemical Company, Bell Chasse, La.

Procedure is faster, more accurate, and requires much less technical manpower to supply precise results than former wet analytical methods

Problem: About four hours was required to run a conventional wet analysis of lube oil additives during their manufacture at the Oronite Chemical Company plant near New Orleans. Production could stand this slow procedure, but a speedier method was needed to keep up with an expected increased production rate.

Former procedure, using modified ASTM methods, required the services of five chemists for testing metallic elements as needed. Wet analytical control methods were not as accurate as desired. Cost of glassware for the tests was considerable.

Solution: Plant installed a Quantometer emission spectrometer in the laboratory for process control of lube oil additives during manufacture. This installation consists of three principal parts: 1) recording console, 2) source unit for providing electrical energy and, 3) grating spectrometer with graphite disc rotating electrode chamber for sample.

In order to test a sample, about 10 grams of the relatively viscous liquid is dissolved in an equal portion of solvent containing a known amount of a reference element. Prepared sample is transferred to a porcelain boat. It is then placed on excitation stand.

Rotating disc electrode picks up sample and introduces it into spark which produces an emission spectrum. Adjustments of current to the spark can be made at source unit. Readings of the intensity of wave length of light emitted are taken directly at strip chart recorder. By the use of standard curves, scale readings are converted into percentage of element present.

Spectrometer is enclosed in an aluminum box weldment encased in a sheet-steel insulated cabinet. Copper coils on walls of enclosure permit precise temperature control. Unitized construction allows ready replacement of electrometer amplifier, phototube voltage supply, relay voltage supply, channel controls, integrators, and attenuators. This simplifies maintenance and increases flexibility.

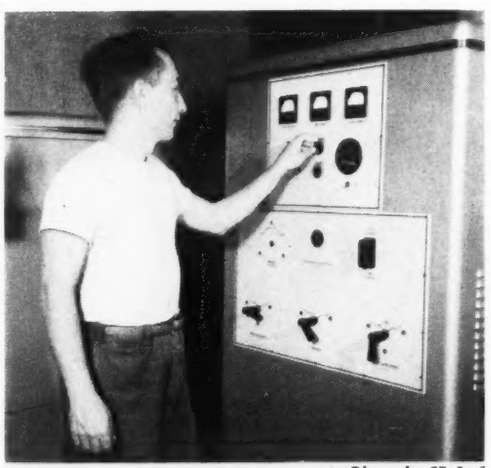
In a number of tests excellent agreement was shown between spectroscopic and chemical measurements of element content. Spectroscopic analyses are made on the lube oil additives before entry to storage tanks and on subsequent shipment from the tanks. From these data collected for 24 different additive types, it was possible to compute standard deviations for the combined effect of analytical and manufacturing variables. These standard deviations, shown in following table, demonstrate the close control obtainable on shipments of additives.

	Calcium	Phosphorous	Zinc
Standard Deviation (percent of element present)	1.4	1.6	1.5
Average deviation from mean (percent of element present)	±1.0	±1.1	±1.0

Results: Emission spectrometer in use at Oronite helps to maintain the uniformity and high quality of the 300-400 oil additive formulations produced at the plant. Speed of analyzer permits tests to be run in all stages of manufacture and on final tank car lots. Instrument is also used for trouble shooting. Without the analyzer, it would not be possible to obtain the present measure of close process control. Spectrometer has allowed plant to maintain this close check on quality with increasing production.

Another outstanding advantage of the instrument is the speed of the unit and the amount of techni-

(Please turn to page 86)



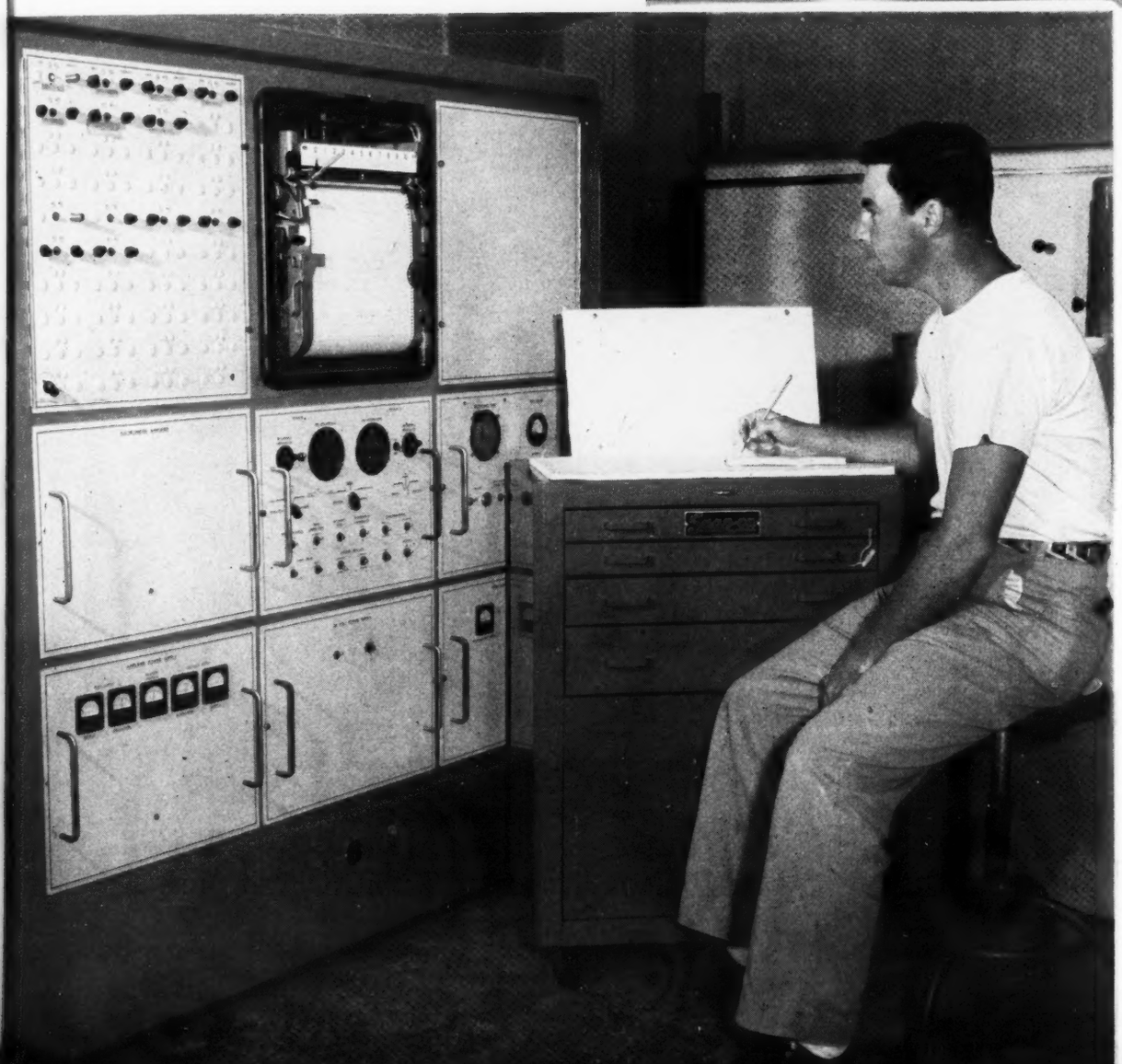
Photos by CP Staff

An adjustment is made on operating source unit which provides electrical energy for analyzer

for the laboratory

ANALYSES

Diluted liquid sample in beaker will be poured into porcelain boat before inserting under carbon disc rotating electrode



Operator records data from console of emission spectrometer at Oronite Chemical

Emission Spectrometer

(*Continued from page* 84)

cal manpower released for other duties. At present one man can run about 60 analyses — four elements on 15 samples — in about one hour. By previous wet methods, it would have taken four hours to run five analyses. Only about four minutes is required to analyze a sample on the spectrometer after it has been prepared.

If the plant didn't have the machine, about a dozen or more chemists would be needed to run the analyses and even then, the present degree of process control would not be achieved.

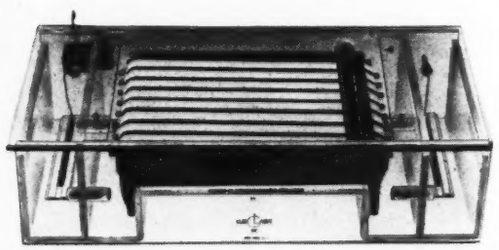
(Quantometer emission spectrometer is product of Applied Research Laboratories, Dept. CP, 3717 Park Place, Glendale 8, Calif. . . . or for more information check 1623 on form opp. last page.)

Is completely equipped unit for zone electrophoresis — needs only water . . .

uses free horizontal suspension of strips and has tension device to hold paper taut

Uses: As complete apparatus for processing either paper strips or starch blocks in large-scale preparative electrophoresis.

Features: Paper strips from apparatus for zone electrophoresis can be transferred directly to drying oven by insertion of entire paper carrier.



Apparatus for zone electrophoresis has device for keeping paper strips taut

Description: Electrophoresis apparatus is completely equipped unit for immediate operation requiring only distilled water. Instrument uses free horizontal suspension of strips. Sagging of strips is prevented by tension device holding paper taut throughout experiments. Tight sealing cover provides rapid moisture saturation of strips. Electrodes are platinum. Electrolytic decomposition products are screened from buffer chambers. Buffer level is recorded on centimeter scales. Interlock switch is provided to avoid shock hazard.

Large scale preparative electrophoresis is carried on in migration cell by removing paper strip car-

another example of exciting work at los alamos...

PREPARATION OF RaLa SOURCES

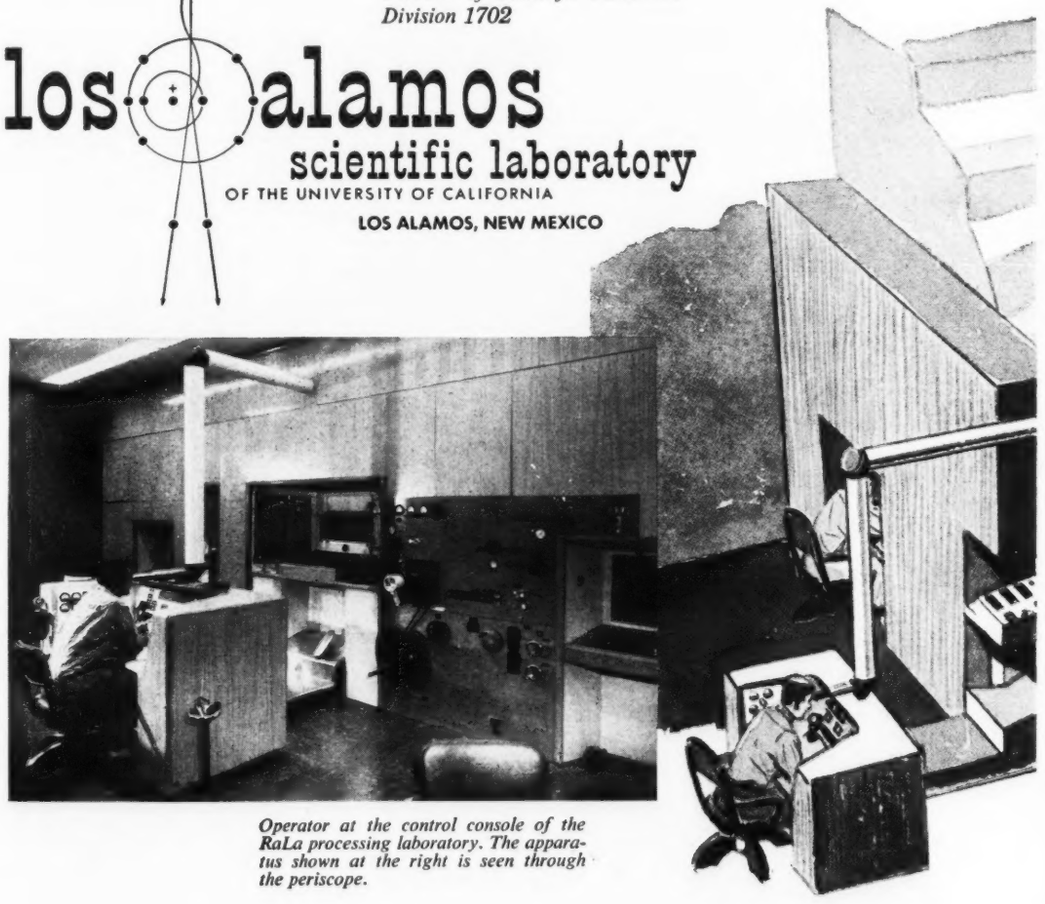
Since 1944 the Los Alamos Scientific Laboratory has pioneered in the study of the effects of intense radiation on chemical, biological and radiographic systems. Among energy sources for such experimentation are extremely small, high-intensity gamma ray emitters containing radioactive lanthanum-140. Known as RaLa, these sources range up to 10,000 curies (370 million million disintegrations per second, equivalent to several times the known amount of the world's extracted radium).

Obviously, preparation of RaLa sources is done entirely with remote-handling equipment largely controlled with pushbuttons and actuated through servo-mechanisms. Design and much of the fabrication of the handling apparatus are also Los Alamos accomplishments and the Laboratory facility is one of the most highly developed in the United States.

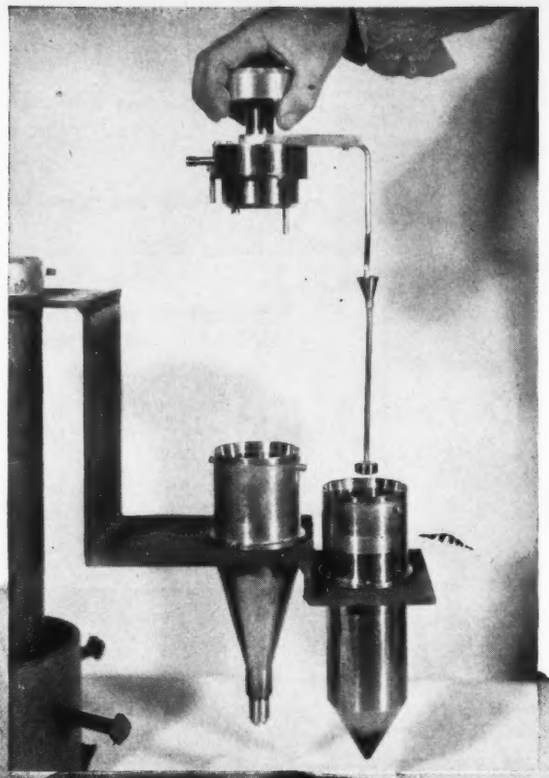
Scientists and engineers interested in these or other projects at Los Alamos Scientific Laboratory are invited to write to:

Director of Scientific Personnel
Division 1702

los alamos
scientific laboratory
OF THE UNIVERSITY OF CALIFORNIA
LOS ALAMOS, NEW MEXICO

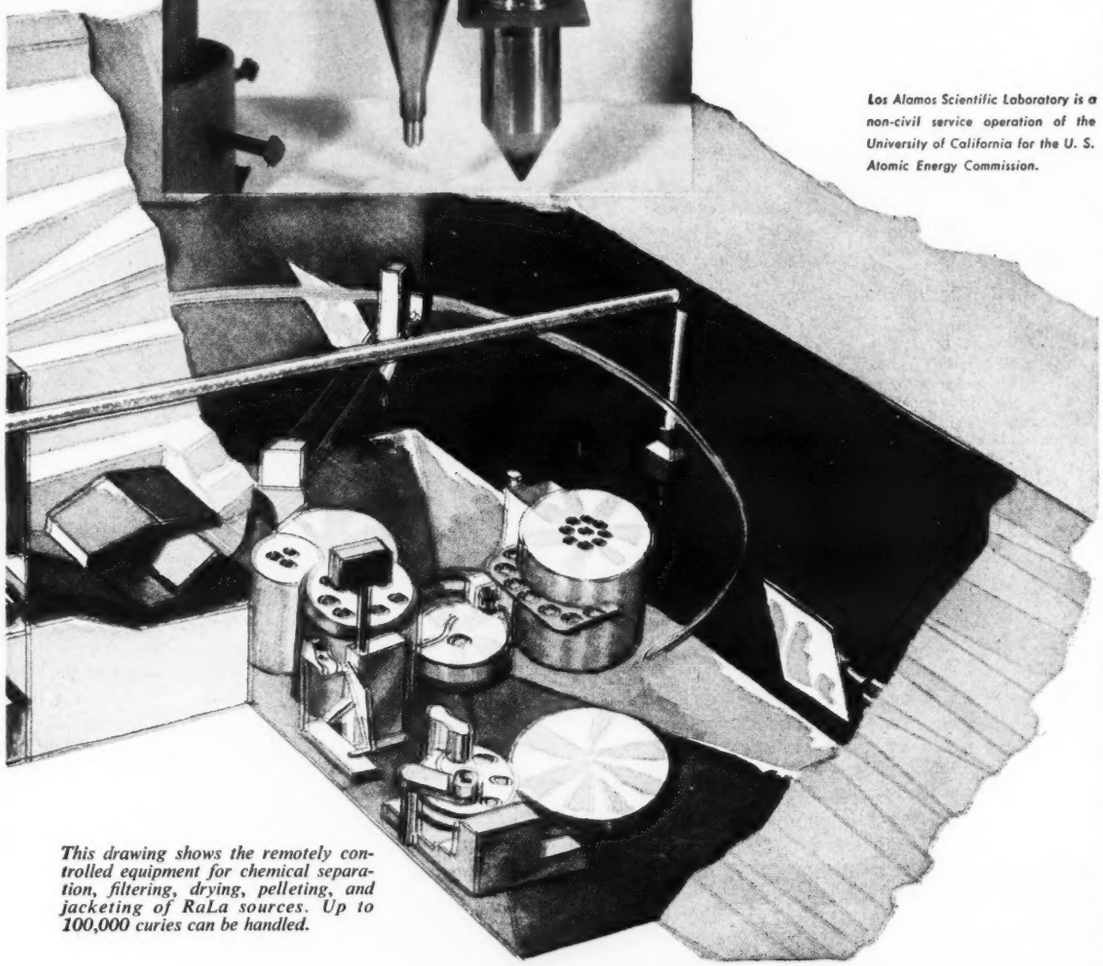


Operator at the control console of the RaLa processing laboratory. The apparatus shown at the right is seen through the periscope.



The apparatus to the left is used for precise alignment of the filtering assembly used in hot cells for RaLa processing. When in actual use it is operated by remote control.

Los Alamos Scientific Laboratory is a non-civil service operation of the University of California for the U. S. Atomic Energy Commission.



This drawing shows the remotely controlled equipment for chemical separation, filtering, drying, pelleting, and jacketing of RaLa sources. Up to 100,000 curies can be handled.

rier and inserting adjustable starch tray. Samples of 1-5 ml can be prepared.

Voltages can be set and read from 0 to 500 volts. Double range of 0-20 and 0-200 ma gives wide calibration spread on meter scale for small differences in current setting. Instrument operates on 115v AC.

(Labglass Electrophoresis Apparatus is product of Laboratory Glass & Instruments Corp., Dept. CP, 514 W. 147th St., New York 31, N. Y. . . . or check 1625 on form opposite last page.)

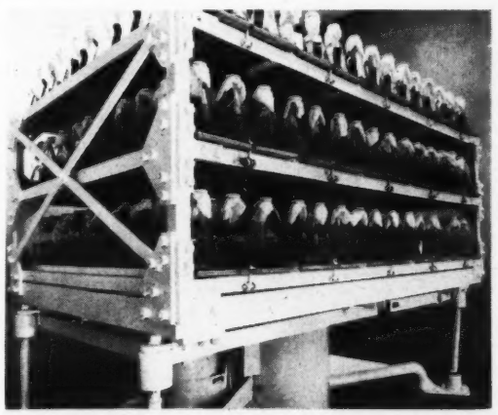
Simulates growth conditions occurring in antibiotic production units . . .

hundreds of easily manipulated small volumes can be accommodated on one agitator

Uses: As laboratory or pilot agitator or shaker for simulating production conditions required for growth of antibiotics. Unit can also be used for any similar purpose requiring agitation of fluid materials in many containers of small volume.

Features: Pilot agitator can accommodate up to 450 glass Erlenmeyer flasks of 500 cc capacity. Greater number of smaller containers could be accommodated.

Description: Agitator is specialized adaptation of manufacturer's sifter. Horizontal boards replace

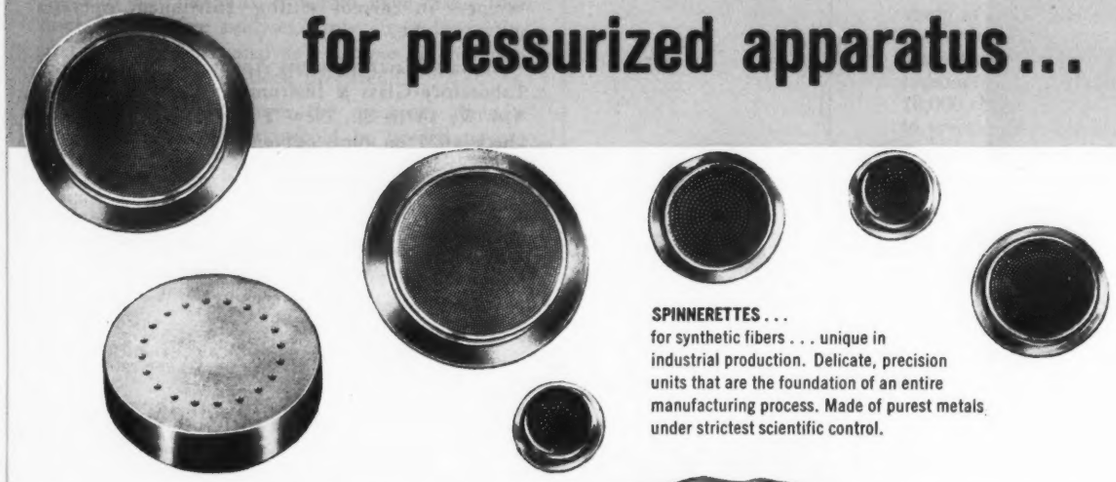


Agitator holds many hundreds of flasks for controlled agitation conditions

usual sifting screens. Glass flasks are held in position on boards by spring clips. Each of 15 boards will accommodate 30 flasks. Special superstructure holds three tiers of boards. Unit will agitate the flasks for several hours or days, depending upon requirements. Agitator operates on DC power.

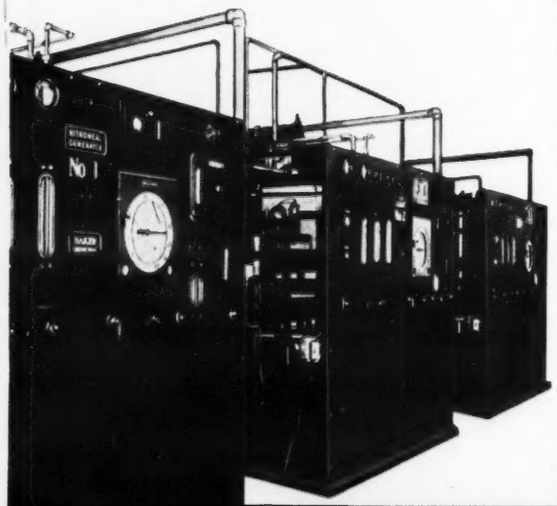
(Gyro-Whip DC sifter is product of Sprout, Waldron & Company, Inc., Dept. CP, Muncy, Pennsylvania. Check 1626 opposite last page.)

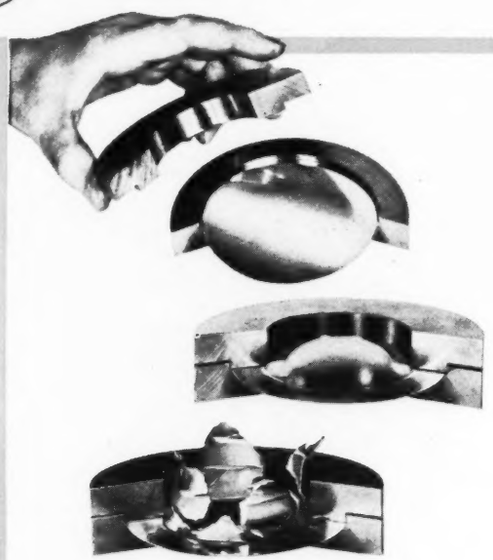
for synthetic fibers...
for producing nitrogen...
for pressurized apparatus...



SPINNERETTES...
for synthetic fibers . . . unique in industrial production. Delicate, precision units that are the foundation of an entire manufacturing process. Made of purest metals under strictest scientific control.

NITRONEAL® GAS GENERATOR...
with a controllable hydrogen content — produces oxygen-free gas consisting only of nitrogen, hydrogen and water vapor. Hydrogen content can be varied and maintained as desired between 0.25% and 25%.





RUPTURE DISCS...
discs of precious metals, resistant to most corrosive agents and unattacked under conditions that base metal discs could not withstand. Specific physical properties ensure bursting only at the predetermined pressure.

Write for complete catalog material and details.

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NEW YORK • SAN FRANCISCO • LOS ANGELES • CHICAGO

ENGELHARD INDUSTRIES

RESEARCH MAINTAINS BAKER'S LEADERSHIP IN PRECIOUS METALS

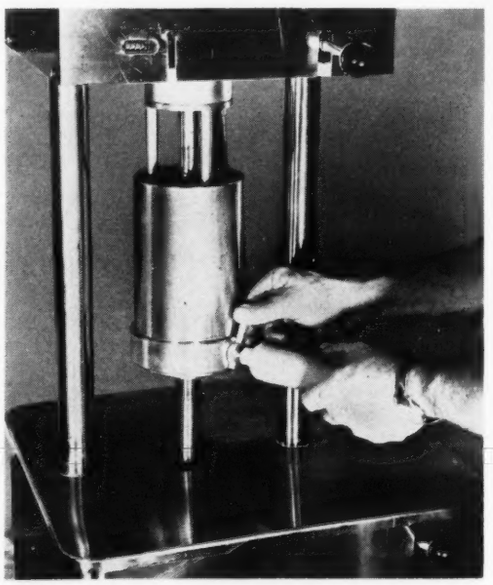
When inquiring check 1627 opposite last page

Mixes under pressure — mix is air-free

Has counter to register number of dasher cycles for more uniform batches

Uses: Blending materials in manner that assures mix will be air-free. Can be used for mixing catalyst and additive materials.

Features: Pressure mixer allows mixing of up to quart of base material and delivery of mix, under pressure, into a polyethylene cartridge.



After being mixed under pressure, material is delivered, still under pressure, to polyethylene cartridge

Description: Pressure mixer operates by means of two double acting air cylinders. Lower cylinder forces entrapped air through an air bleeder and seal at top of container. Container is then held under pressure while upper cylinder forces a dasher (a cylinder) through the material with an involved motion. Counter registers number of dasher cycles for more uniformity of batches. Number of cycles necessary for thorough mix is determined by experiment. Cabinet and pots are stainless steel. Mixer is easily dissassembled for cleaning.

(Semco Pressure Mixer is product of Pyles Industries, Inc., Dept. CP, 8926 Second Avenue, Detroit 2, Mich. . . . or for more information reader may simply check 1628 on Reader Service slip which is located opposite last page.)

Redesigned gas purification bottle has leak-proof cap and longer gas spiral . . .

gas travel through absorbent is increased by 144%

Uses: "Gas bottle" purifies gases for laboratory instrument work and analysis.

Features: Jar has leak-proof cap and longer glass spiral, increasing gas travel through absorbent.

Two-part cap of gas purifier is leak-proof

Description: Apparatus is reworking of original design of Dr. Lowell Milligan (Cornell University). By enlarging and lengthening glass spiral, and putting it into a tapered jar, gas travel through absorbent has been increased. Two-part screw cap offers leak-proof operation under above-normal pressures. Broad base makes jar hard to tip.

Acid-and-alkali resistant plastic cap is held in place by threaded steel ring which screws onto jar. Neoprene gasket, cemented in recess on underside of cap, fits tightly against rim and seals jar. Gas is forced through glass tube to bottom of bottle. It escapes by traveling spiral path (36.8") of glass insert.

(Fisher-Milligan Bottle is product of Fisher Scientific Co., Dept. CP, 303 Fisher Bldg., Pittsburgh 19, Pa. Check 1629 on form opposite last page.)

"Well . . . 10,000 pounds a month is just a little above our present capacity, but . . ."

Credit the idea to Don Clarke and H. Sabin, Dow Chemical Company, Midland, Michigan.

Emery NEWS

WEIGHING SYSTEM

BIN, TANK AND HOPPER EDITION No. 3

Covering design, development and application data on Emery Weighing Systems for industrial applications

EMERY CELLS USE HEISE GAUGES FOR MAXIMUM OPERATING ACCURACY

More than 100 years ago, Eugene Bourdon, of Paris, discovered that tubes of non-circular cross section permanently bent in the form of a semi-circle, tend to unbend if subjected to internal fluid pressures. Such tubes have become known as Bourdon tubes. Fig. 1.

The Heise Bourdon Tube Company, Inc., Newtown, Conn., has been developing and manufacturing these gauges for more than 25 years and has earned a world-wide reputation for precision workmanship and precision accuracy.

We were the first to use these Heise gauges in our testing machine work and we have continued to apply them to the present Emery Weighing Systems.

In remote indication applications, specially installed Emery indicators have proven satisfactory for distances up to 125 feet. The quick response of these indicators is due to the relative incompressibility of the hydraulic fluid in the system. The cell will automatically compensate for any volumetric changes in the weighing system without sacrificing accuracy. Pressure from the Emery Cell to a suitable indicator, recorder or controller is carried through ⅛" copper tubing. Fig. 2.

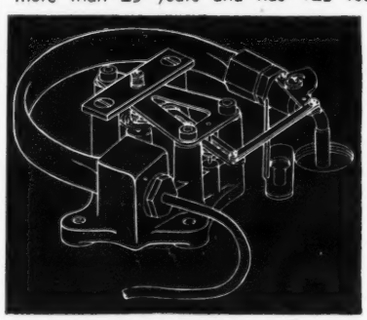


FIGURE 1

SIMPLEST APPLICATION OF EMERY WEIGHING SYSTEM INVOLVES ONE CELL AND APPROPRIATE INSTRUMENTATION

TANK, BIN OR HOPPER MAY BE SUPPORTED OR SUSPENDED

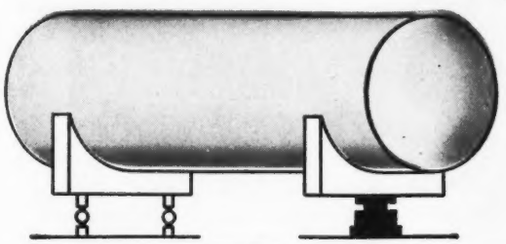


FIGURE 3

The tank shown in Fig. 3 is one of the simplest arrangements of an Emery Weighing System utilizing the new "Rolling Ball" Load Cell. It consists of one Emery Cell to support the front end of the tank and two Emery Ball Pivot Assemblies or some other support such as an "I" beam for the back of the tank.

The hydraulic pressure in the cell actuates an indicator, recorder or controller which is so calibrated that it reads directly the weight of the tank contents.

The basis for the arrangement of the tank shown in Fig. 4 lies in the use of a compression cell and a carrying structure to seat the load directly on the cell.

The alternate arrangement, shown in dotted line, involves the use of a tension cell supported from the floor above with the weight of the tank suspended on a rod which would go directly through the cell.

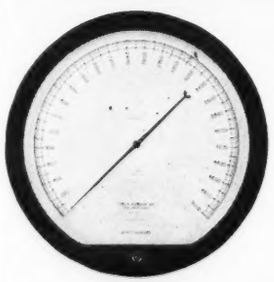


FIGURE 2

NOTICE

These are but three of the fifteen different arrangements discussed in detail in our new Bulletin 561. If you have not yet received a copy, be sure to write today or check the proper number on the Readers' Service Card in this publication. We will be happy to send you a copy by return mail.

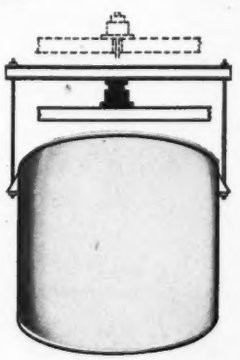


FIGURE 4

THE A. H. EMERY CO. PRECISION SINCE 1872 FORCE MEASUREMENT

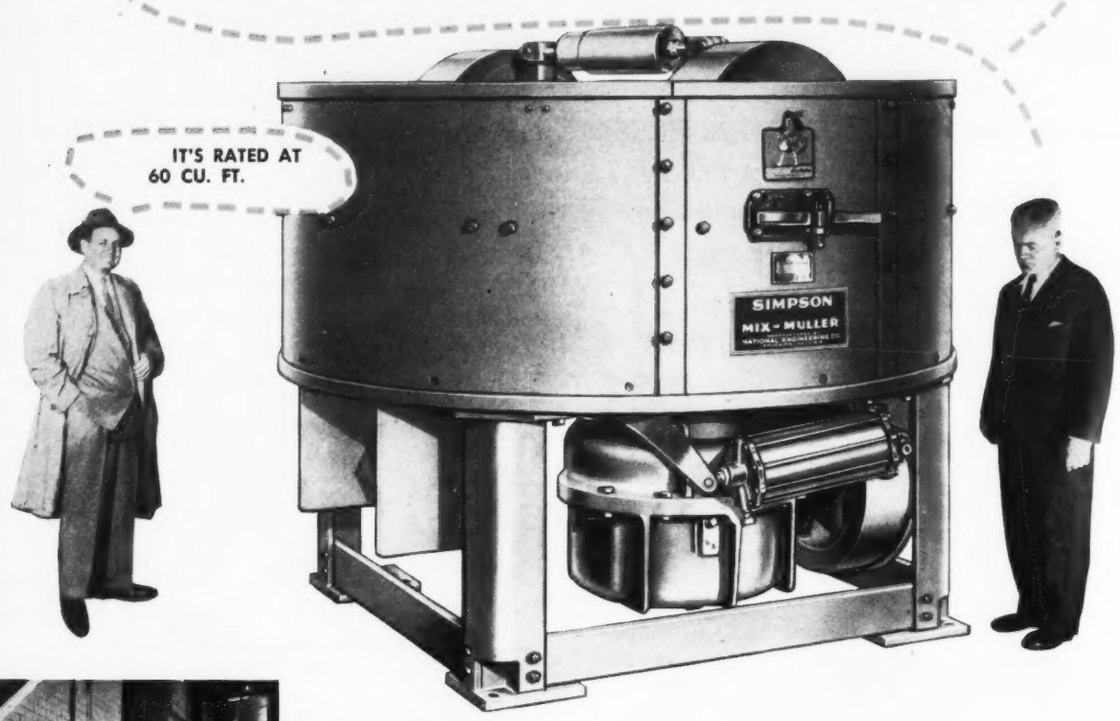
THE A. H. EMERY COMPANY
Pine Street • New Canaan, Conn.

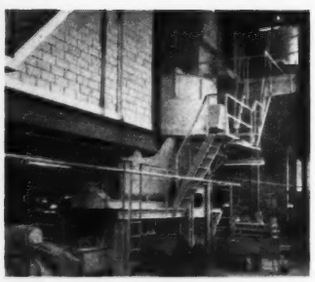
When inquiring check 1630 opposite last page

HOW'S THIS FOR

MIXING CAPACITY?

IT'S RATED AT 60 CU. FT.





CONTINUOUS MIXING

Effective arrangement of equipment is *part* of the National service. Photo shows No. 2F Mix-Muller (30 cu. ft. capacity) arranged to prepare ceramic body on a continuous basis for pug mill and deairing extruder. Mixer is charged from overhead bins.

THIS IS THE 3F SIMPSON MIX-MULLER — with it, you can prepare 40 to 60 cu. ft. of *intimately* blended materials . . . in minutes. How many minutes depends upon what you're mixing, naturally. But, we have users who once counted materials preparation time in *days* . . . who now talk in minutes, thanks to their Simpson Mix-Muller.

Mixing is our *business* at National; it has been since 1912. In recent years, increased mixing capacity for today's production requirements has been a *big* part of that business. That's why the Simpson Mix-Muller utilizes a stationary pan, automatic bottom discharge and is equipped with spring loaded mullers . . . to make the *most* of every minute of mixing cycle duration.

Available in 13 models in batch capacities of 1/10 to 60 cu. ft., Mix-Mullers are available to meet a variety of processing needs—as a reaction vessel, for heating or cooling while mixing . . . in stainless or other special materials of construction. Write for details.

Here's the Handbook on Mulling. Write for your copy today!

SIMPSON *MIX-MULLER* **DIVISION**

NATIONAL ENGINEERING CO., 640 Machinery Hall Bldg., Chicago 6, Ill.

When inquiring check 1631 opposite last page

FOR THE LABORATORY

Lists laboratory equipment

Centrifuges, homogenizers, automatic pipets, electrophoresis and chromatography equipment, gas and moisture testers are some of the items priced and illustrated in catalog of eight pages.

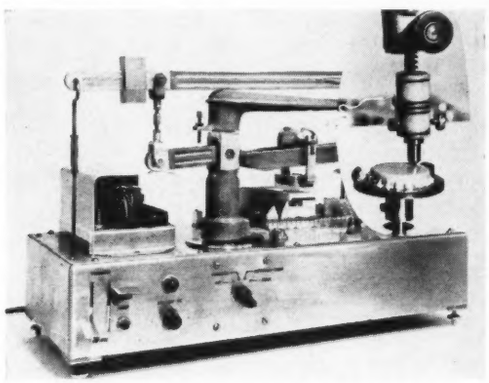
Fall catalog is issued by Ivan Sorvall, Inc., Dept. CP, P.O. Box 230, Norwalk, Conn. Specify 1632 opposite last page.

Eliminates 'human factor' in determining coating hardnesses . . .

instrument's interlocking of controls enables it to be operated easily and accurately

Uses: Originally designed for surface hardness determinations of beverage crowns and continuous thread jar closures, instrument can also be used on any non-conductive organic coating applied to a metallic surface.

Features: Interlocking of controls prevents improper operation. Tests may be made under uniformly increasing or constant load conditions. "Phonographic" travel of stylus permits long path to be made in small area. Unit can be used on other than flat surfaces and its operating cycle changed to meet specific applications.



Inset shows test being made on beverage crown. Instrument will test organic coating applied to metallic surface

Description: Instrument automatically applies load of uniformly increasing increments to a stylus moving slowly away from fixed center of test specimen toward periphery while specimen is being rotated at fixed speed. Stylus is held by dielectric holder and is connected to control grid of a thyratron tube. When coating is pierced by stylus, the grounding of control grid operates relay in plate circuit and drive motor is stopped. The load in grams required to effect the break-through is then read from instrument scale. Operating

cycle can be varied (by changing gears between motor and drive mechanism) from maximum of 33 to normal of 20 or minimum of 12 seconds.

(Gardner Albrecht coating hardness tester is manufactured by Gardner Laboratory Inc., Dept. CP, PO Box 5728, Bethesda 14, Md. . . . or for more information check 1633 on form opposite last page.)

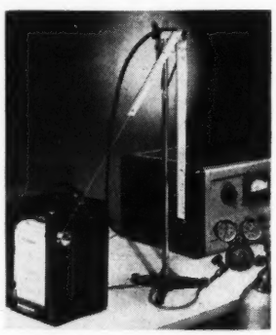
Locates 'tagged' compounds on chromatograms . . .

measures distribution and total amount of material within a spot

Uses: As scanner of paper chromatograms to locate chemical compounds tagged with radioisotopes, measure distribution and total amount of material within a spot, and discriminate between chemical compounds tagged with different radioisotopes.

Features: Chromatograph scanner can operate without a window, making it suitable for work with low energy tracers. Background of scanner is only 6-10 counts/minute without lead shield.

Description: Chromatograph scanner can be mounted on standard laboratory support and adjusted to desired height. Scanning head is provided with two slits which can be interchanged without displacing chromatogram. Smaller slit can be used to locate point of maximum activity within spot. Wider slit can be used to determine total activity as well as to examine weak samples.



Complete automatic scanner of paper chromatograms including rectilinear recorder unit

Standard length of slit is 1 inch and scanning head can accommodate strips up to 1½ inches in width. Instrument can be used with manual as well as automatic scanning. For manual scanning only a counting rate meter, or scaler, is needed. For automatic scanning a graphic recorder with a strip drive mechanism is used. If Esterline-Angus recorder is available, automatic drive assembly can be installed by operator. However, scanner can be supplied as a complete automatic unit with rectilinear recorder if desired.

(Chromatograph Scanner is product of The Forro-Scientific Company, Dept. CP, 833 Lincoln Street, Evanston, Ill. . . . or for more information check 1634 on form opposite last page.)

Globe Valve Mantle
Mantle on Flask for Cartridge Heater
Series M Heating Mantle
Heating Top for Two-Neck Flask
Heating Top for Two-Neck Flask with Side Opening
GLAS-COL makes a complete line of HEATING MANTLES
. . . for chemical process, pilot plant and laboratory heating applications
CO2 Purged Heating Mantle
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Special Mantle for a Three-Neck Flask
Spherical Mantle for a Two-Neck Flask with Side Opening
Resin Distillation Flask Mantle
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Erlenmeyer Flask Mantle
three types:
glass-fabric mantles,
quartz-fabric mantles,
650° C Glas-Col "R" mantles
GLAS-COL
ELECTRIC HEATING MANTLES
Heating Mantle on a Butterworth Padder
Trademark Registered U. S. Patent Office
U. S. Patents — 2,282,078; 2,231,506; 2,739,220; 2,739,221
Specialists in Laboratory and Pilot Plant Heating Problems
GLAS-COL APPARATUS COMPANY, INC.
Dept. CP • 711 Hulman Street
Terre Haute, Indiana

When inquiring check 1635 opposite last page

NEW!

GAULIN RE* COLLOID MILL

This is the Model 2A, shown with accessory equipment — stainless steel 3-way valve, by-pass tubing and tank — for processing quantities as small as 8 oz.

The Special PLUS Features of the Gaulin RE*

Exclusive! Removable rotor, stator and shaft seal can be disassembled without tools. Shaft leakage is eliminated.

Special micrometer adjustment, from .001 to .040, positions gap opening between rotor and stator. Adjustment made when running or not.

Here's a brand new concept in Colloid Mills — the Gaulin RE* with removable rotor, stator and shaft seal. The horizontal two-stage design gives maximum capacity per horsepower and unusual processing efficiency.

Special Materials Available
Rotor and stator can be furnished in stainless steel, tungsten carbide, ceramic, alundum and other special materials. Parts are interchangeable.

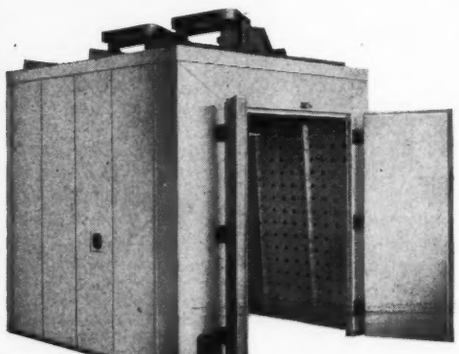
Wide Range of Capacities
The Gaulin RE* has a capacity range from 0-2600 gph. Model 2A: 0-310 gph; Model 4A: 0-1000 gph; and Model 8A: 0-2,600 — all depending on product, specifications and gap setting.

Send for New Bulletin
Put this new Colloid Mill to work for you! Complete data on the RE* line is available in a special bulletin. Ask for C-56 from: The Manton-Gaulin Mfg. Co., Inc., 55 Garden St., Everett 49, Mass.

*patent applied for

MANTON-GAULIN MFG. CO., INC.
Everett, Massachusetts

When inquiring check 1636 opposite last page →



ROCKWELL OVENS

for Drying
Chemicals
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Process Materials

Provide Fast Recirculation Heating

Uniform distribution of high velocity, recirculated, heated air in Rockwell Ovens assures faster drying, baking or curing at precise temperature.

Designed for gas, electric or steam heating, they are made in a wide range of standard cabinet, rack and truck types for batch processing and in special conveyor types.

Investigate the oven with built-in heating "know-how." Write for Catalog.

W. S. ROCKWELL COMPANY

ROCKWELL SINCE 1890 BUILT

FURNACES • OVENS • BURNERS • VALVES • SPECIAL MACHINERY

2207 ELIOT STREET • FAIRFIELD, CONN.

Sales Representatives in Principal Cities

When inquiring check 1637 opposite last page

for the laboratory

Laboratory worker — using polaroid camera — develops an x-ray image of specimen just 60 seconds after exposure. Microscope can be used for either direct-viewing or camera photography

Having magnification comparable with light microscopy, the . . .

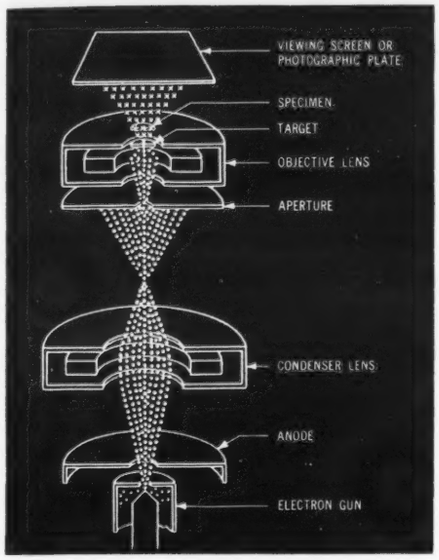
x-ray microscope supplies the third dimension

. . . revealing structures invisible with light or electrons

Uses: As research tool for exploring and studying contamination in chemicals, deterioration of fibers and textiles, penetration of dyes and adhesives, studying under-surface changes caused by corrosion, evaluating distribution of particles in a mixture or suspension.

One good possibility for use is in quality control of carbon black in the rubber industry. Another possibility is in structure studies of organic oils and coatings. Instrument could be of advantage in studying thick coatings such as those obtained by "hot melt" techniques. Study of metals and alloys is a "natural" for the instrument.

Features: Inherent advantage of x-ray microscope is that it penetrates to interior of the object and reveals structure not otherwise visible. It has an advantage over the optical microscope in depth of



This is how the x-ray microscope works. A narrow cone of electrons emerges from the electron gun, enters the condenser lens where it is collimated. The collimated beam enters the objective lens which produces a demagnified image of the electron source at the principal focus of the lens. This tiny electron source produces an equally tiny x-ray source on the target — a thin beryllium window ordinarily coated with tungsten.

The remainder of the instrument is simply a shadow projection microscope. Thus, a specimen placed near the x-ray source casts an enlarged image on a fluorescent screen or photographic plate

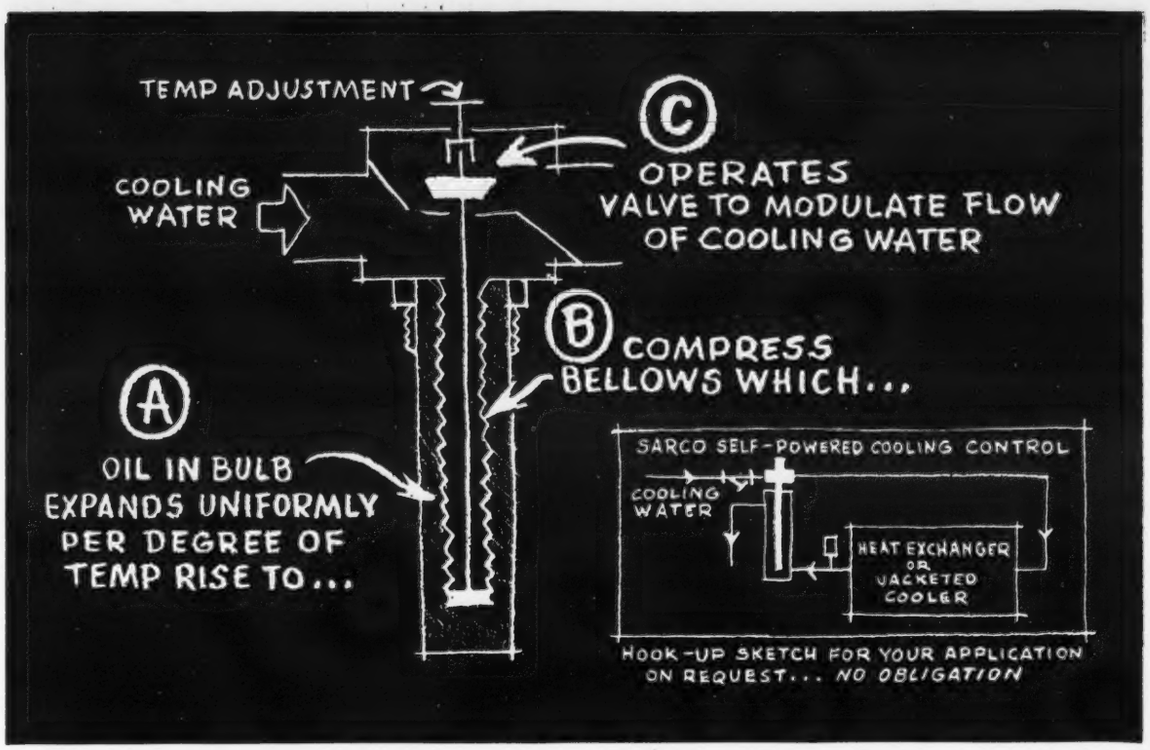
focus, which permits three-dimensional examination of the specimen, each "plane" being in focus. No special sectioning is required to prepare the specimen.

While not as powerful as the electron microscope, the x-ray microscope has an advantage in that it does not require mounting the specimen in a vacuum or other special preparation techniques.

Description: Basically, the microscope operates by means of a narrow beam of electrons emerging from an electron gun. This beam is cut down to desired size by a condenser lens, and then passes through an objective lens. The tiny beam then bombards the target, made of a sheet of tungsten thick enough to stop the electrons but thin enough to permit the generated x-rays to pass through. Remainder of the instrument is a simple shadow projection microscope. That is, a specimen placed near the x-ray source casts an enlarged image on a fluorescent screen for viewing by eye, or on a photographic film where the image is recorded.

Key to operation of the x-ray microscope lies in extremely small size of focal spot. The target is

(Please turn to next page)


TEMP ADJUSTMENT
C
OPERATES VALVE TO MODULATE FLOW OF COOLING WATER
COOLING WATER
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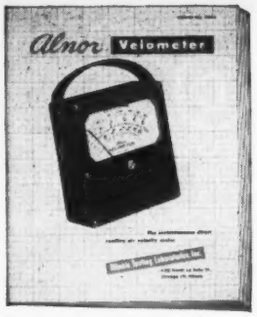

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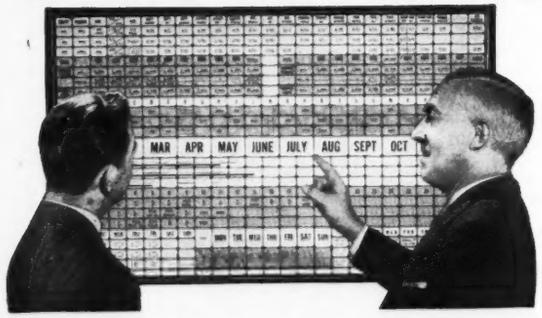

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X-ray Microscope

(*Continued from preceding page*)

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Complete unit includes x-ray microscope, mechanical vacuum pump, 4 x 5″ camera, and lead-glass fluorescent screen for direct viewing. Power required is 95-125v, 60-cycle, single-phase. Desk-like console of the instrument contains the high-vacuum system, electron optical system, power supply, and control and instrument panel. Dimensions are 38″ high, 26″ deep, 27″ wide. Weight is approximately 300 lb.

(X-Ray microscope is product of X-Ray Department, General Electric Company, Dept. CP, 4855 Electric Ave., Milwaukee 14, Wis. . . . or for more information check 1641 on form opp. last page.)

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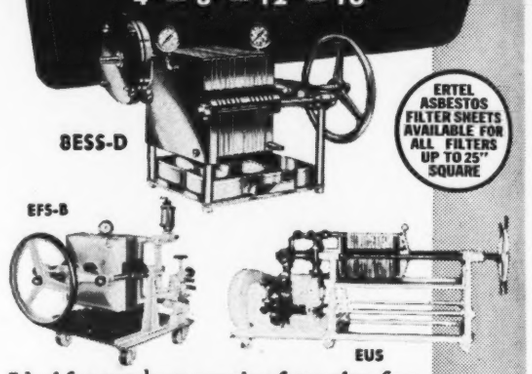

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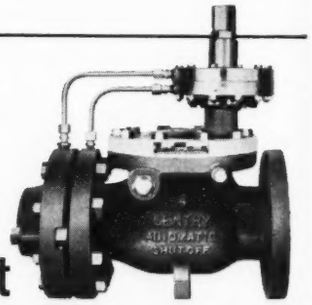

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ished glass plates. Warmed drop of sample is placed between plates, forming a thin film when plates are pressed together.

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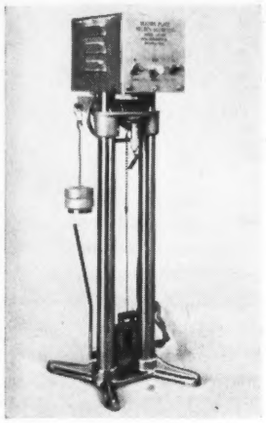

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(Hallikainen-Shell Sliding Plate Microviscometer is manufactured by Hallikainen Instruments, Dept. CP, 1341 Seventh St., Berkeley, Calif. . . . or for more information check 1644 on form located opposite last page.)

Bulletin features bibliography on chromatography

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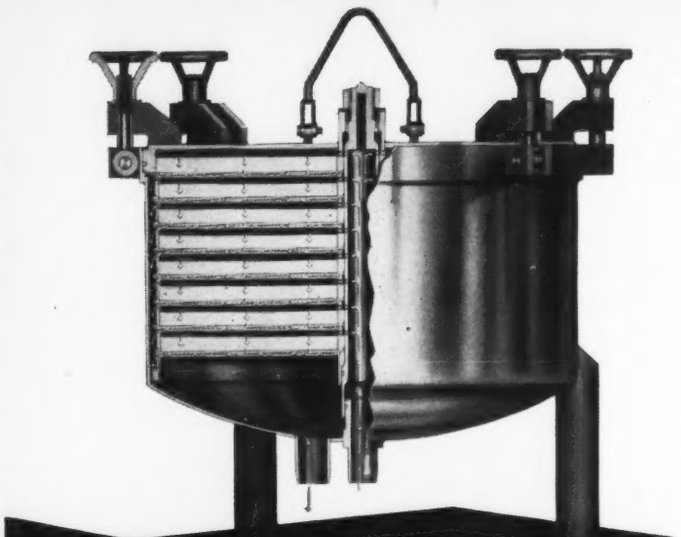

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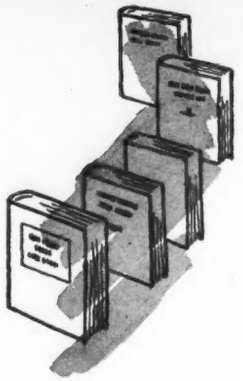

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Here in one volume, Marshall Sittig of the Ethyl Corporation has brought together all available information on a currently important subject: sodium. He has covered in detail the manufacturing processes for the metal, its solubility and alloys, handling problems, uses, inorganic and organic chemical reactions, and the analytical chemistry of sodium.

With the cooperation of G. E. Thompson and Edward Garelis, also of Ethyl Corp., a 145-page data section on sodium's physical and thermodynamic properties is included as one chapter.

Number 133 in the ACS Monograph Series, this volume has 529 pages, 150 illustrations, and a total of over 2000 references. In addition to the nine chapters, there are author and subject indexes.

To obtain "Sodium — Its Manufacture, Properties and Uses" remit $12.50 direct to Reinhold Publishing Corp., 430 Park Ave., New York 22, N.Y.

Steric Effects in Organic Chemistry

Reviewed by DANA S. DAVIS
Tuscaloosa, Alabama

Endeavoring to relate the influence of steric effects upon structure, properties, and reactivities of organic compounds, Melvin S. Newman, professor of chemistry, Ohio State University, has compiled and edited this 710-page discussion.

Among thirteen individual topics covered are those dealing with substitutions in saturated and aromatic systems, additions to unsaturated functions, intramolecular rearrangements, elimination and cleavage reactions, steric factors of organometallics, equilibrated systems, molecular complexes, and physical properties. Presented, too, are calculations of the magnitude of steric effects, and separation of polar, steric, and resonance effects in reactivity.

The difficulties encountered in depicting three-dimensional structures on a single plane are largely overcome by the author through use of several notations. Where configuration (of "bonded" atoms) alone is to be designated, the Fischer projections are employed. Sketches of the Fischer-Hirschfelder models representing the atomic diameters and interatomic distances in their true proportions are included, and perspective drawings are used where simulation of bond angles is stressed. The latter two graphical representations, while excellent in aiding the reader to visualize the proposed geometry, are awkward to reproduce. Recognizing the need for a method of showing angular relationships accurately with a minimum of care in drawing, the author has devised a projection system of his own that may be preferred in many instances.

Book is fully foot noted and supplied with author and subject indexes.

To obtain "Steric Effects in Organic Chemistry" remit $12.50 direct to John Wiley & Sons, Dept. CP, 440 Fourth Ave., New York 16, N. Y. When inquiring specify 1648 on the convenient Reader Service slip opposite last page.

Perspectives in Organic Chemistry

Reviewed by ROBERT C. KRUG
Associate Professor of Chemistry
Virginia Polytechnic Institute

"Perspectives in Organic Chemistry" (x + 527 pages), edited by Sir Alexander Todd, contains eighteen essays written by former students and/or friends of Sir Robert Robinson, to whom the volume is dedicated upon the 70th anniversary of the birth of this famous organic chemist.

Authors and subjects of their essays are as

reviews of current technical and reference work . . . summarized for you by authorities in the field with the CP staff

follows: Linus Pauling, The Nature of the Theory of Resonance; Paul D. Bartlett, Reaction Mechanisms; Wilson Baker, The Development of the Concept of Aromaticity; D. H. R. Barton, Stereochemistry; V. Prelog, Bedeutung der vielgliedrigen Ringverbindungen fur die theoretische organische Chemie; A. J. Birch, Biosynthetic Theories in Organic Chemistry; R. B. Woodward, Synthesis; Karl Ziegler, Neue Entwicklungen der metallorganischen Synthese; E. L. Hirst; Carbohydrates; Sir Alexander Todd, Nucleic Acids; L. Ruzicka, Bedeutung der theoretische organische Chemie fur die Chemie der Terpenverbindungen; C. W. Shoppee, Steroids; E. Schlitter, Aklaloids; J. W. Cornforth, Isotopes in Organic Chemistry; Karl Folkers, Micro-organisms in Organic Chemistry; James Walker, Chemotherapy; Holger Erdtman, Organic Chemistry and Conifer Taxonomy; A. Butenandt, Organische Chemie und Genetik.

The volume has a subject index, and each essay has its own references, given at end of the article. Approximately 140 pages are in German, or about 27 percent of the book excluding the index. As stated by the editor, the essays are not detailed reviews; however, the pleasing and in some cases personal style of the work will offer the reader an insight into the topics which would not be available in a journal article.

To obtain "Perspectives in Organic Chemistry" remit $7.50 direct to Interscience Publishers, Dept. CP, 250 Fifth Avenue, New York 1, N.Y. Specify 1649 opp. last page.

Organic Chemistry

Reviewed by GEORGE M. TOFFEL
Associate Professor of Chemistry
University of Alabama

During the past six years much information has been accumulated leading to more acceptable methods of representing structures of organic compounds. This information, along with the total synthesis of important fatty acids, carbohydrates, peptides, enzymes, alkaloids, isoprenoids, tropolones, steroids and antobiotics, has required almost complete revision of several chapters in the third edition of this work. Considerable rearrangement of material was done in rewriting the book. It is interesting to note that the number of pages (1112) remains the same as for the first edition.

Authors Louis F. and Mary Fieser introduce the subject with a brief historical sketch of early organic chemistry. This material is followed by the usual chapters on hydrocarbons, halides, and alcohols. Refreshing comments of usefulness and peculiar properties of the various compounds make reading a pleasure. Creativeness of organic chemistry is emphasized, a feature that should impress and stimulate the imaginations of students. Modern theory is introduced in Chap. 3, followed by unification and survey of mechanisms in Chap. 13.

The first ten chapters supply a wealth of facts as well as some theory which can be integrated by use of ideas presented in Chapter 13. Stereochemistry is presented in a most readable and interesting manner in Chapter 11. Chapter 12 deals with facts and ideas on ring formation and ring stability in organic compounds. These ideas are applied in later chapters discussing sugars, terpenes, alkaloids, and steroids.

Throughout the text, drawings depicting structure are given. Reactions complete as to yield and conditions are given wherever feasible. These should impress on readers the importance of conditions and that most organic reactions as represented by equations are far from quantitative in yielding a desired product. Problems are given at the end of each chapter, with more or less complete solutions in the back of the book.

Four hundred and fifty-four one- or two-line biographical sketches of past and present chemists are given in the footnotes

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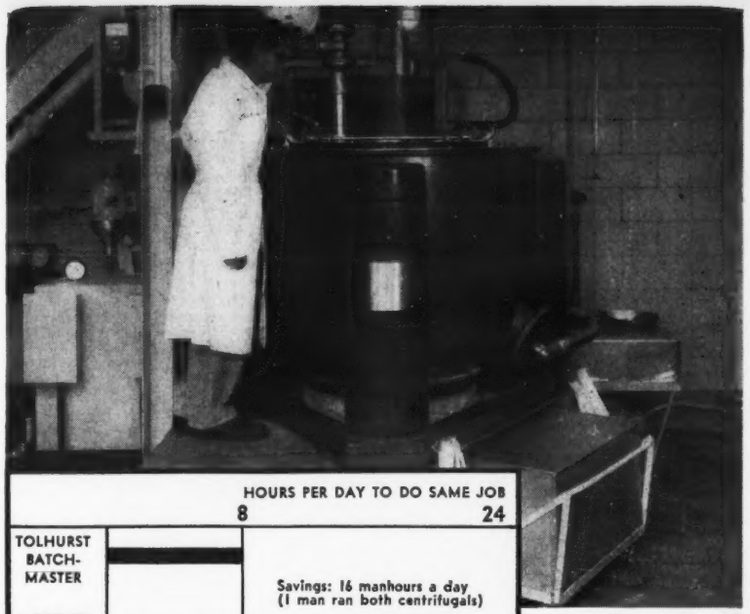

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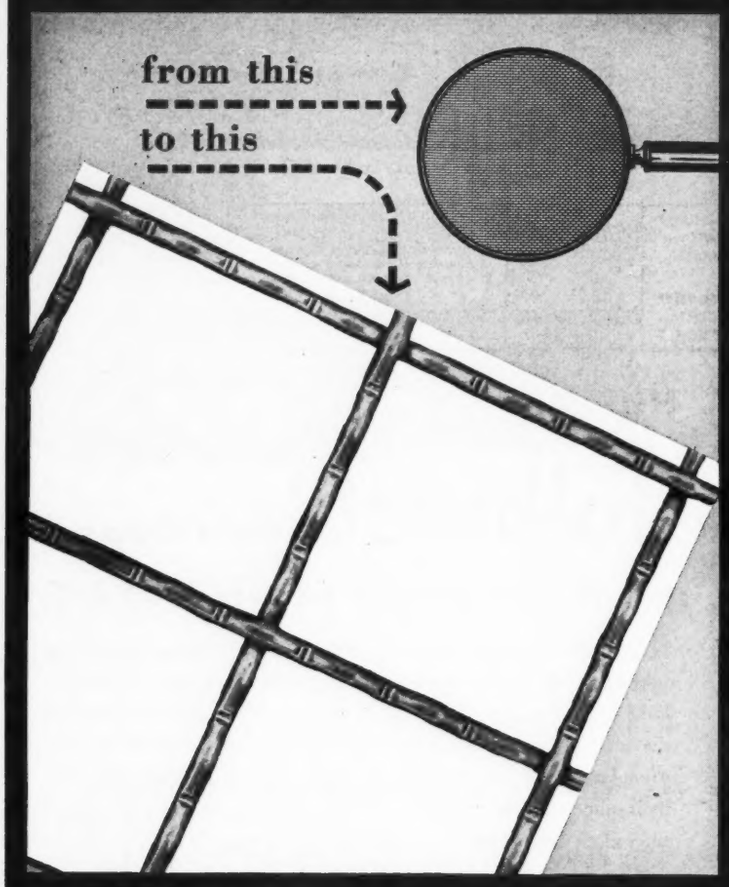

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(*Continued from preceding page*)

throughout the book. These include vital statistics, the university where he obtained his advanced degree or studied, the professor under whom he worked, and the university or company of his major service. This should be very useful for those doing literature searches. In addition, reading references to important literature are given at the end of each chapter.

Fieser and Fieser's book is both a treatise and a textbook. It is so interestingly written that one finds it difficult to stop reading it. The book should be particularly useful to those who had their organic chemistry some years ago and would like to relearn and gain an insight into new ideas and work being done in organic chemistry today. It is well-printed and handsomely bound. Definitely an outstanding contribution to chemical literature.

To obtain "Organic Chemistry," remit $10 direct to Reinhold Publishing Corporation, 430 Park Ave., New York 22, N. Y.

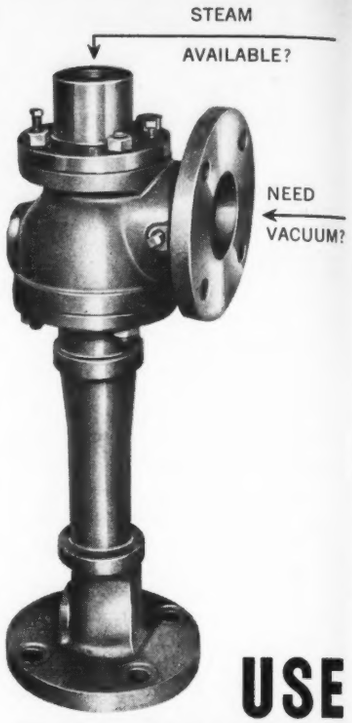
Medicinal Chemistry, Vol. II

Reviewed by **James W. Woods**
Assistant Professor of Biochemistry
University of Alabama

This book, edited by F. F. Blicke and C. M. Suter, is the second volume of the series of reviews sponsored by the Medicinal Chemistry Division of the American Chemical Society; it continues the high standards of the first volume.

Four chapters, Some Chemical Aspects of the Cardiac Glycosides, by Arthur Stoll with a supplement by T. L. Johnson; Synthetic Estrogen, by John A. Hogg and Jerome Korman; Analgesies, Arylpiperidine Derivatives, by C. M. Suter; β-Haloethylamine Adrenergic Blocking Agents; Chemistry and Structure-activity Relationships, by Glenn E. Ullyot and James F. Kerwin, compose this volume.

It is stated in the preface to the series that "A chief objective of 'Medicinal Chemistry' is to include in each chapter references to all compounds that have been tested for a particular type of pharmacological activity." This is accomplished by copious use of tables. Thus, in the present edition approximately 146 of the 309 pages are devoted to listing those compounds which have been tested for the appropriate activity. The mere listing of the compounds tested, with results given as "active" or "inactive" has very



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little meaning unless the testing method is mentioned. Thus, the inclusion of brief descriptions with references, of the pharmacological tests employed in the evaluation of the compounds is a most welcome feature.

The various chapters vary somewhat in scope, but in general consist of a brief introduction, followed by a section devoted to the chemistry of the compounds under consideration, including methods of synthesis, and conclude with a pharmacological section. Since a book such as this cannot delve completely into both chemistry and pharmacology, perhaps, neither the chemist nor the pharmacologist will be completely satisfied with the treatment as given, but the documentation is excellent, and enables one to obtain readily any desired detail from the original literature.

It is unfortunate that so much time elapsed between submission of the various chapters and publication. This interval caused at least one author to add a bibliographic supplement including articles through August 1953. In the other chapters literature is apparently reviewed only through 1952. Such delay in publication serves to hasten the obsolescence of a book in an active field.

This series should be useful to all chemists interested in the development of medicinal compounds.

To obtain "Medicinal Chemistry" remit $10 direct to John Wiley and Sons, Inc., Dept. CP, 440 Fourth Ave., New York 16, N. Y. When inquiring specify 1654 on form opposite last page.

Selected Combustion Problems II

Reviewed by Professor T. PAUL TORDA
Brooklyn Polytechnic Institute

This 495-page book is made up of papers presented at the AGARD Combustion Colloquium held in Liege, Belgium, in December 1955. It consists of five major parts, each containing several papers, plus a preface by Dr. Theodore von Kármán, Chairman of AGARD, an introduction by the AGARD Combustion Colloquium Subcommittee, description of presented films, and subject index. Technical papers only are listed in this review.

Part 1 — Aircraft Engines and Fuels — consists of two papers about jet aircraft: Les Performances des Moteurs d'Avions

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MORRIS *meets the CHALLENGE of INDUSTRY'S NEW FRONTIERS*

No Matter What Your Present or Future Heavy Pumping Problems Are . . . Morris Can Satisfy You NOW!

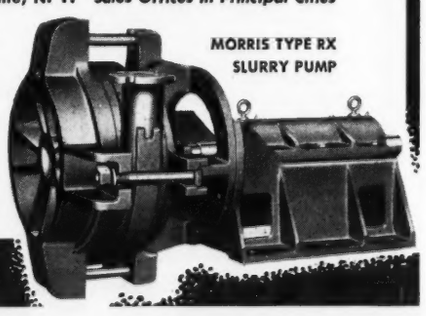
The new Morris Type RX Slurry Pump is specifically engineered to handle the viscosities, densities and special characteristics of the slurries and sludges developing from industry's ever-advancing products. It is engineering attuned to the future . . . designed to meet the demands of a towering tomorrow.

Rugged, Dependable, Trouble-Free; Operates With Minimum Attention . . . Cuts Maintenance Costs!

The new Morris RX is designed for performance perfection under all conditions, including heavy, coarse, fine slurries, dispersions and sludges. Operates at low speeds; quickly dismantled for inspection, avoiding lengthy lay-up time.

MORRIS MACHINE WORKS
Baldwinsville, N. Y. *Sales Offices in Principal Cities*

FREE SERVICE: Morris engineers will gladly recommend the custom-made pump best suited to your needs. Send necessary data today.



MORRIS
CENTRIFUGAL PUMPS

When inquiring check 1656 opposite last page

RECENT BOOKS

(Continued from preceding page)

(Performance of Aircraft Engines), by A. Capetti, and Fuels for Turbojet Powered Aircraft, by R. R. Hibbard and H. C. Barnett.

Part 2 — Ignition and Flammability — contains four papers: Fundamental Principles of Flammability and Ignition, by B. Lewis and G. von Elbe; The Ignition of Flowing Gases, by L. D. Wigg; Inflammation et Allumage dans les Moteurs-Fusées a Propegols Liquides (Inflammation and Ignition in Liquid Propellant Rocket Motors), by M. Barrere and A. Moulet; and Thermal Ignition with Particular Reference to High Temperatures, by R. S. Brokaw.

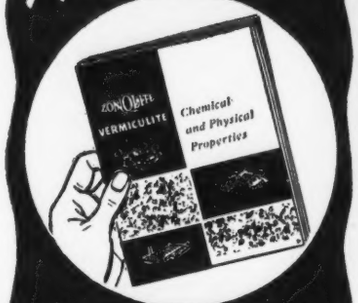
Part 3 — Transport Properties — contains three papers: Fundamental Equations in Aerothermochemistry, by Theodore von Kármán; Quelques Considérations sur la Convection de la Chaleur aux Grandes Vitesses et aux Températures Elevées (Some Considerations of Heat Convection at High Speeds and at Elevated Temperatures), by E. A. Brun; and Sources of Transport Coefficients and Correlations of Thermodynamic and Transport Data, by J. Hilsenrath. Part 4 — High Altitude Combustion Problems — contains four papers: Combustion en Altitude dans les Turbo-Réacteurs (Combustion at Altitude in the Turbojet), by J. Soissons; The Influence of Altitude Operating Conditions on Combustion Chamber Design, by S. L. Bragg and J. B. Holiday; Combustion in the Turbojet Engine, by S. Way; and Problems of Combustion Under Altitude Conditions (Treated from Fundamental Viewpoint), by H. G. Wolfhard.

Part 5 — Similarity, Scaling and Fundamental Parameters in Combustion — contains five papers: Similarities in Combustion, a Review, by A. E. Weller; Scaling of Gas Turbine Combustion Systems, by D. G. Stewart; Recherche du Bruleur Optimum en Ecoulement Air-Kérosène á Grande Vitesse (Invetigation of Optimum Burner in High-Speed Air-Kerosene Flow), by B. Salmon and H. Vigne; Scaling of Liquid Fuel Rocket Combustion Chambers, by C. C. Ross, and Considerations on the Problem of Scaling Rocket Motors, by L. Crocco.

This book, as so many others conceived and sponsored by AGARD, is a very valuable contribution to the field and contains a wealth of information useful to both the research worker and the engineer.

To obtain "Selected Combustion Problems II" remit $12.50 direct to Interscience Publishers, Dept. CP, 250 Fifth Ave., New York 1, N.Y. When inquiring specify 1657 on form opposite last page.

GET THIS FREE BOOK!



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Newly published technical data covering Zonolite vermiculite's "physical and chemical properties"—the wide range of information you need to fit this versatile mineral into your manufacturing and processing pattern.

Tells New and Tested Uses for the WONDER MINERAL

VERMICULITE

Product of Zonolite Company

Zonolite vermiculite is the remarkable mineral with many unique characteristics of interest to research men, designers, and product developers. New book describes chemical and physical properties. Countless uses, including:

- Fertilizer conditioner
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Zonolite vermiculite, readily available from our 40 plants is a granular crystalline mineral of low density. Possesses high thermal and absorptive properties, and is available in a *wide* range of particle sizes. Send today for free book and inspection sample.

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☐ Please send me my free copy of your ready-reference book, "Zonolite Vermiculite Chemical and Physical Properties."
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Firm_____
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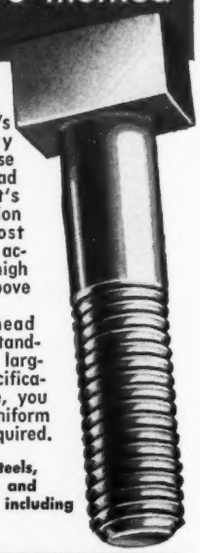
When inquiring check 1658 opposite last page

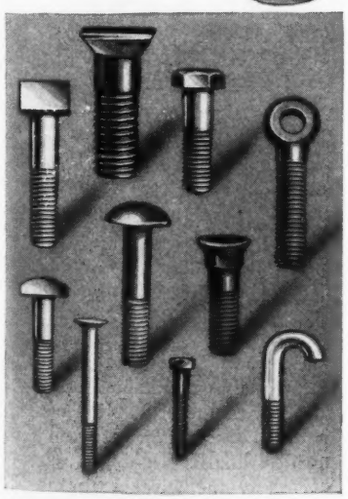
Threaded Specialties

lower cost
TEE BOLTS
by an
exclusive method



Among Pawtucket's many specialty products are these lower-cost tee-head bolts. Pawtucket's exclusive production method keeps cost low, dimensional accuracy unusually high and strength above standard.
Pawtucket tee head bolts are made in standard sizes ¼" and larger, or to your specifications. In any size, you can depend on a uniform Class 3 fit, if required.

All standard steels, stainless steels and non-ferrous metals, including Titanium



BETTER BOLTS SINCE 1882

PAWTUCKET
MANUFACTURING COMPANY
327 Pine St. • Pawtucket, R. I.
THE PLACE TO SOLVE YOUR BOLT PROBLEMS
T.M. REG.
"The Bolt Man"

When inquiring check 1659 opposite last page

1955 Vacuum Symposium Transactions

Reviewed by D. S. Davis
Professor of Engineering
University of Alabama

The second annual meeting of the Committee on Vacuum Techniques was held October 13-15, 1955, at Mellon Institute of Industrial Research. This report of that meeting covers seven papers on fundamental developments in vacuum technology, four that deal with applications and processes, six devoted to methods and techniques for obtaining high vacuums, and three that present standards and nomenclature.

The 101-page volume includes 142 figures and photographs, numerous references to the rapidly growing literature of vacuum technology, and a brief account of the meeting. Paper with the title of "A Graphical Solution for the Analysis of Vacuum Systems Performance" contains charts that are miscalled nomographs, and several logarithmic plots are too small and too faintly printed to be very useful. In general, though, the book represents a competent printing job of difficult material.

To obtain "1955 Vacuum Symposium Transactions" remit $10 direct to Committee on Vacuum Techniques, Dept. CP, Box 1282, Boston 9, Mass. When inquiring, specify 1660 on form opposite last page.

Polyethylene

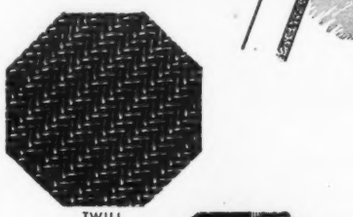
The development and technology of polyethylene from 1898 through 1956 are covered in detail in this 564-page volume, number eleven in the publisher's series on high polymers.

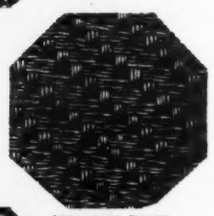
Co-authors Raff and Allison of Koppers Company have divided their monograph into ten chapters: history, properties and manufacture of ethylene, polymerization, modification of polyethylenes, molecular structure, properties of polyethylenes, analysis and testing, processing and handling, uses and applications, and finally a chapter on production and consumption statistics, uses, and producers. A 36-page bibliography contains 1152 references. There are 228 figures and 122 tables.

To obtain "Polyethylene" remit $16.00 direct to Interscience Publishers, Inc., Dept. CP, 250 Fifth Ave., New York 1, N.Y. Specify 1661 on form opposite last page.

Newark Metallic Filter Cloth...

...says STOP to Solids


TWILL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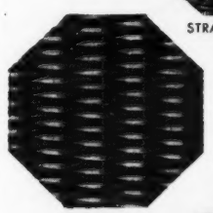
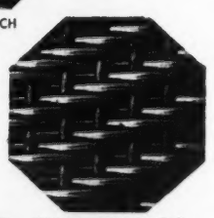

PLAIN DUTCH

Enlarged approximately 3X


TWILL DUTCH SINGLE

TWILL DUTCH DOUBLE

Newark Metallic Filter Cloth does stop solids — the wedge-shaped openings allow only the filtrate to pass through. And, Newark Cloth is reversible, both sides being identical. Newark Metallic Filter Cloth is woven firmly and uniformly without loose wires, guaranteeing good filtration all over.

Newark Metallic Filter Cloth is available in a variety of weaves in *all* malleable metals, and is adaptable to practically all types of filters. When writing, please give us details on your process.

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NEWARK for ACCURACY

Newark Wire Cloth COMPANY
351 VERONA AVENUE • NEWARK 4, NEW JERSEY

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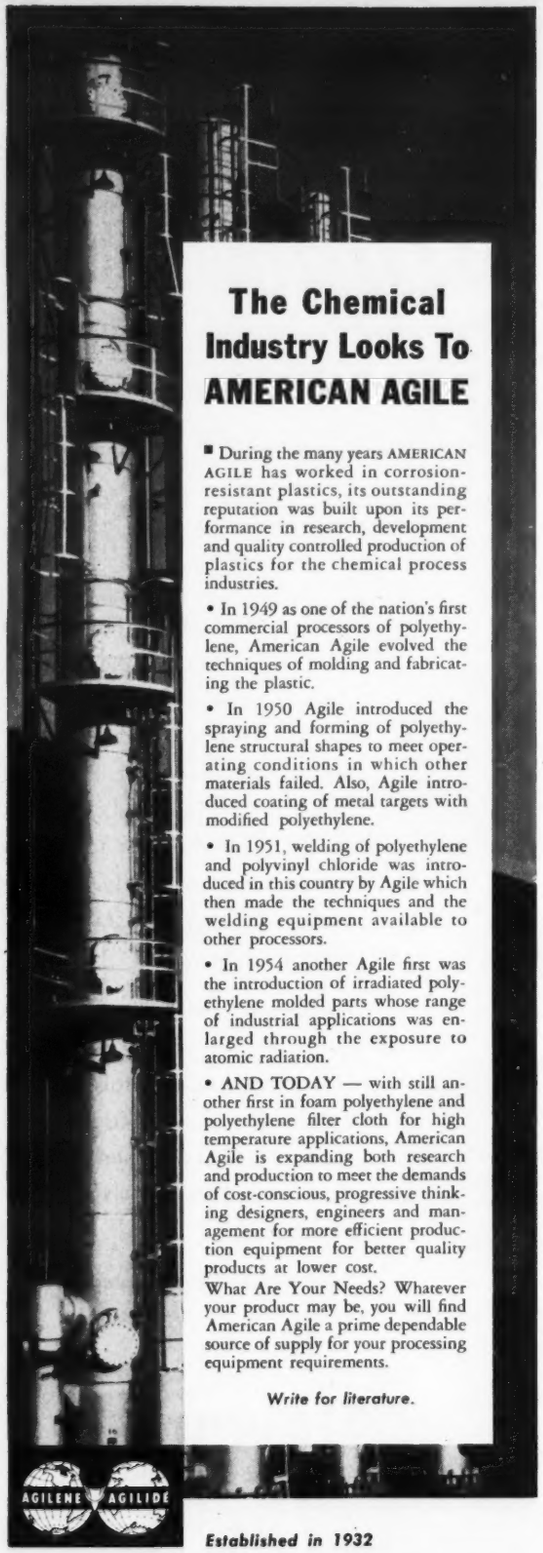

The Chemical Industry Looks To AMERICAN AGILE

■ During the many years AMERICAN AGILE has worked in corrosion-resistant plastics, its outstanding reputation was built upon its performance in research, development and quality controlled production of plastics for the chemical process industries.

• In 1949 as one of the nation's first commercial processors of polyethylene, American Agile evolved the techniques of molding and fabricating the plastic.

• In 1950 Agile introduced the spraying and forming of polyethylene structural shapes to meet operating conditions in which other materials failed. Also, Agile introduced coating of metal targets with modified polyethylene.

• In 1951, welding of polyethylene and polyvinyl chloride was introduced in this country by Agile which then made the techniques and the welding equipment available to other processors.

• In 1954 another Agile first was the introduction of irradiated polyethylene molded parts whose range of industrial applications was enlarged through the exposure to atomic radiation.

• AND TODAY — with still another first in foam polyethylene and polyethylene filter cloth for high temperature applications, American Agile is expanding both research and production to meet the demands of cost-conscious, progressive thinking designers, engineers and management for more efficient production equipment for better quality products at lower cost.

What Are Your Needs? Whatever your product may be, you will find American Agile a prime dependable source of supply for your processing equipment requirements.

Write for literature.

AGILENE AGILIDE

Established in 1932

AMERICAN AGILE CORPORATION

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When inquiring check 1663 opposite last page

Coconut oil fatty acid is sensitive to iron pick-up. Even a very small percentage causes serious discoloration. Here's how Lever Brothers Co. maintains the whiteness and high quality of Lux soap and —

prevents fatty acid contamination by using epoxy coating

Problem: Iron pick-up was contaminating stored coconut oil fatty acids at Baltimore plant of Lever Brothers Co. Storage tanks had been lined with welded sheets of 28-gage, 316 stainless steel at a cost of $4000 per tank. Although steel resisted attack, welded joints caused trouble. Despite careful welding procedures, pinholes and cracks in weldments allowed acids to contact tank metal . . . resulting in contamination of tank contents. Attempts to locate and seal off these flaws failed.

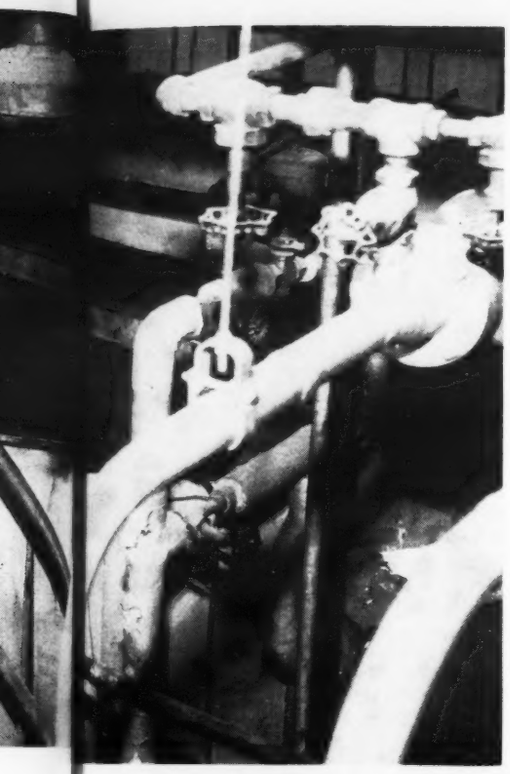
Company tested an aluminum coating based on a silicone resin. Within two months, coating started to flake off and stored material became contaminated.

Fatty acids are pumped from tank cars into storage tank and drawn off in batch weights as they are needed for Lux soap production. Storage tank has capacity of 90,000 lb. Material is maintained at a temperature of 100 to 125°F in order to prevent solidification. Even a small percentage of iron contamination will turn ordinarily light yellow acids a dingy brown, causing the white soap to darken. Acids are stored for an indeterminate period.

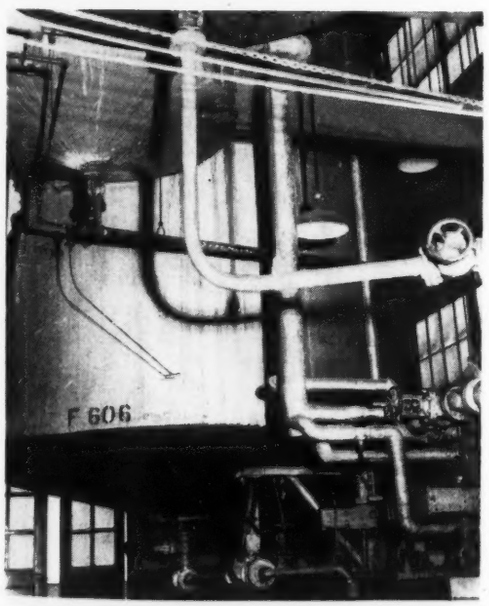
Solution: Company performed a series of laboratory experiments, for temperature and corrosion resistance properties, under simulated operating conditions. As a result of these tests an epoxy-based coating was selected and applied early in 1956.

Storage tank was cleaned with hot caustic, fol-

(*Please turn to page* 104)



J. S. Boudlen, plant manager, inspects 90,000 lb coconut oil fatty acid storage tank. Epoxy lining protects purity of stored material in tank

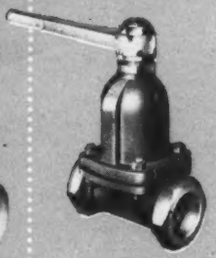


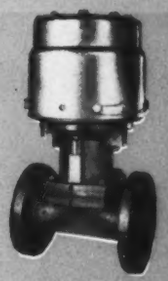
Lower portion of storage tank (F 606). Lining has completely prevented any iron pick-up or discoloration

ALL-PURPOSE VALVE

for handling materials as diversified as corrosive fluids, gases, beverages, viscous materials, foods, compressed air, solids in suspension.

Handwheel Operated


Lever Operated


Power Operated

Grinnell-Saunders Diaphragm Valve

Unsurpassed on lines where corrosion, abrasion, contamination, clogging, leakage and maintenance are costly factors.

In industries as varied as mining, food, textile, pulp and paper, beverage, water and sewage, chemicals . . . Grinnell-Saunders Diaphragm Valves continue to win enthusiastic acceptance. The unique design of the valve — with its flexible, long-wearing, tight-closing diaphragm — offers many unusual advantages.

If you have a valve problem, it will pay you to write Grinnell for further information.

Choice of Materials

Bodies — iron; cast steel; stainless steel; Durimet 20; Hastelloy A, B, C; bronze; Monel; aluminum; PVC (polyvinyl chloride); Saran

Body linings — hard rubber; soft rubber; neoprene; glass; lead; plastics; Heresite; Lithcote

Diaphragms — soft natural rubber; natural rubber; white synthetic rubber; neoprene; reinforced neoprene; butyl; Hycar; Teflon; Kel-F; PVC (polyvinyl chloride); polyethylene

Bonnets — iron; stainless steel; bronze; other materials on special order

Choice of Bodies

Conventional weir type

Straight bodies — screwed; flanged; socket weld; butt weld; socket (solder); sanitary threads; hose ends; Victaulic

Angle bodies — screwed; flanged; socket weld

Other types

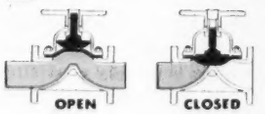
A line of Straightway Valves (for straight-thru flow) and Full-Bore Valves (for ball brush cleaning) also are available

Choice of Bonnets

Handwheel (non-indicating stem, indicating stem); chain wheel; lever (for quick operation); sliding stem (for a wide selection of power operated topworks)

Operating Features

- diaphragm absolutely isolates bonnet mechanism from the fluid in the line
- diaphragm lifts high for streamline flow in either direction
- diaphragm presses tight for positive closure
- simple maintenance — diaphragm easily replaced without removing valve body from line



GRINNELL

WHENEVER PIPING IS INVOLVED

Grinnell Company, Inc., Providence, Rhode Island • Coast-to-Coast Network of Branch Warehouses and Distributors

pipe and tube fittings • welding fittings • engineered pipe hangers and supports • Thermolier unit heaters • valves
Grinnell-Saunders diaphragm valves • pipe • prefabricated piping • plumbing and heating specialties • water works supplies
industrial supplies • Grinnell automatic sprinkler fire protection systems • Amco air conditioning systems

When inquiring check 1664 opposite last page

Fatty Acid Contamination

(*Continued from page* 102)

lowed by carbonization of residual organic materials retained on surface of metal or embedded in weldments. Carbonization was accomplished by circulating hot gases from a portable gas heater. As a final cleaning step, base metal was sand blasted thoroughly with fine firit.

Six coats of epoxy formulation were applied with conventional paint spray equipment. Between applications, temperature of tank was raised to approximately 175°F. Last coat was given a final bake (top temperature of approximately 400°F) to complete cure. Total film thickness was between five and seven mils. Applying this thickness in mutliple coats eliminates any possibility of pinhole failure.

Results: Coating has been in service for more than nine months. Company reports complete satisfaction with no change whatever in color or chemical content of stored fatty acids. Epoxy coating has proved to be not only durable, but economical in comparison to other protective coating methods. Coating has helped to maintain the whiteness and high quality of Lux soap.

(Epon 1007 resin for epoxy formulations is a product of Shell Chemical Corp., Dept. CP, 380 Madison Ave., New York 17, N.Y. . . . or for more information check 1666 on form located opposite last page.)

(LC-34 epoxy formulation was supplied by Lithcote Corp., Dept. CP, 5000 W. Lake St., Chicago, Ill. . . . or for more information check 1667 on form opposite last page.)

"A pop-off valve? . . . what's that?"

These Crane Valves Excel on Secondary Digester Blowdown

Crane 10-inch, 300-lb. No. 33XL cast steel gate valve with 18-8 liners installed on digester in major paper mill, handling corrosive liquors at 100 psi., 400°F.

"Too tough for hot, corrosive liquors"

. . . That's the report this major paper mill gives on Crane No. 33XL cast steel gate valves.

Up to 6 years ago, the mill was forced to replace secondary digester blowdown valves on every shutdown. Corrosion worked the body seat rings loose, made valve closure impossible.

Why did these Crane 33XL valves eliminate this costly maintenance problem? Because the body seat rings, liners and flange faces of these valves are 18-8 SMo alloy, integrally welded—making them tough enough to withstand the hot, corrosive liquors.

When you buy valves on price alone—or because they "look good enough"—you're gambling with your production. Be sure: choose your valves and fittings from the big, complete, strictly quality Crane line—first choice of industry for a century.

You may spot cost-saving ideas in this book of "Valve Performance Facts"—32 case histories throughout industry. Ask your Crane Representative, or write for a copy.

CRANE VALVES & FITTINGS

PIPE • PLUMBING • KITCHENS • HEATING • AIR CONDITIONING

Since 1855—Crane Co., General Offices: Chicago 5, Ill. Branches and Wholesalers Serving All Areas

When inquiring check 1665 opposite last page

Vinyl plastic window is shatterproof, non-flammable . . .

panels resist most acids, oil, and grease

Vinyl plastic window is shatterproof and non-flammable. Installed as translucent window panels, it has undergone severe tests in a western chemical plant. There it withstood the onslaught of dust, storms, high winds, rain, and intense heat. Most acids will not corrode the polyvinyl chloride used for construction of the window. It is also resistant to all oil and grease. Material can be machined, planed, sawed, drilled, nailed, cemented, or welded.

(Plastic window is product of Seiberling Rubber Co., Dept. CP, Akron 9, Ohio . . . or for more information check 1668 on form opposite last page.)

Acrylic resin coating provides improved durability . . .

only one coat of baking enamel is required

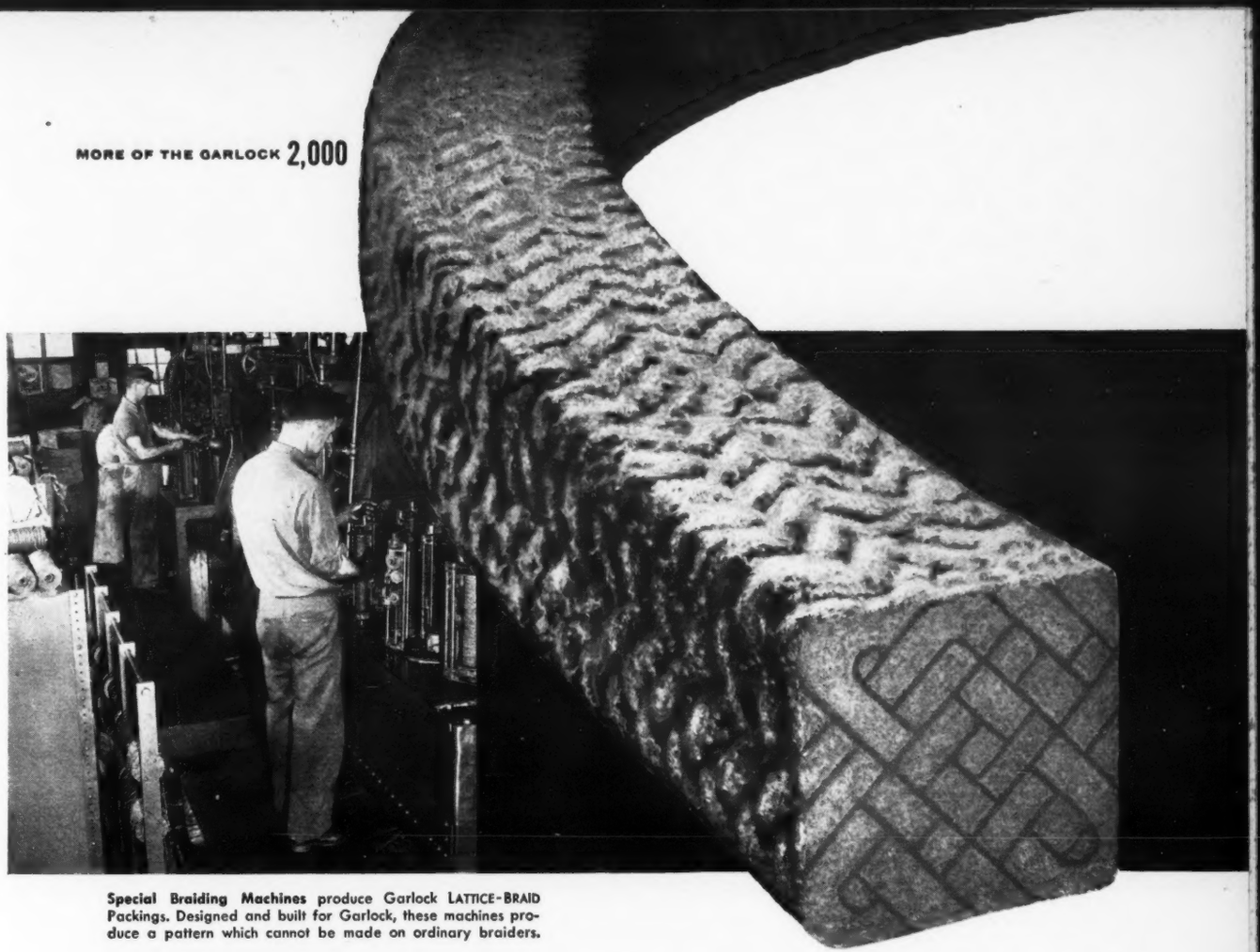
Recently-developed coating is reported to look and perform more like porcelain than any other known organic finish. Coating is based on a series of thermosetting acrylic resins. It has exceptional toughness, mar resistance, durability, and possesses excellent adhesion to various metal surfaces.

Material retains gloss on overbake, has excellent chemical resistance, and retains flexibility. For many applications, one coat is sufficient.

(Duracron coating is product of Pittsburgh Plate Glass Co., Dept. CP, 632 Fort Duquesne Blvd., Pittsburgh 22, Pa. Check 1669 on form opposite last page.)

For more information on product at right, specify 1670 . . . see information request blank opposite last page.

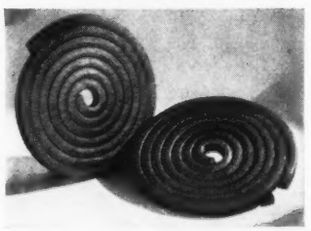
MORE OF THE GARLOCK **2,000**



Special Braiding Machines produce Garlock LATTICE-BRAID Packings. Designed and built for Garlock, these machines produce a pattern which cannot be made on ordinary braiders.

HOW GARLOCK LATTICE-BRAID* PACKINGS DIFFER

from Ordinary Braided Packing



Chemical Industry
Centrifugal dye pumps required repacking every 24 to 48 hours. Changed to LATTICE-BRAID asbestos packing with Teflon impregnation. Results: minimum of 3 months' service.

The Garlock LATTICE-BRAID Packing is distinctly different . . . the result of many years of development and experimental work.

Special machines are required to manufacture the LATTICE-BRAID structure. And the superiority of LATTICE-BRAID packings is due to the unique braiding pattern which cannot be duplicated on ordinary braiding machines.

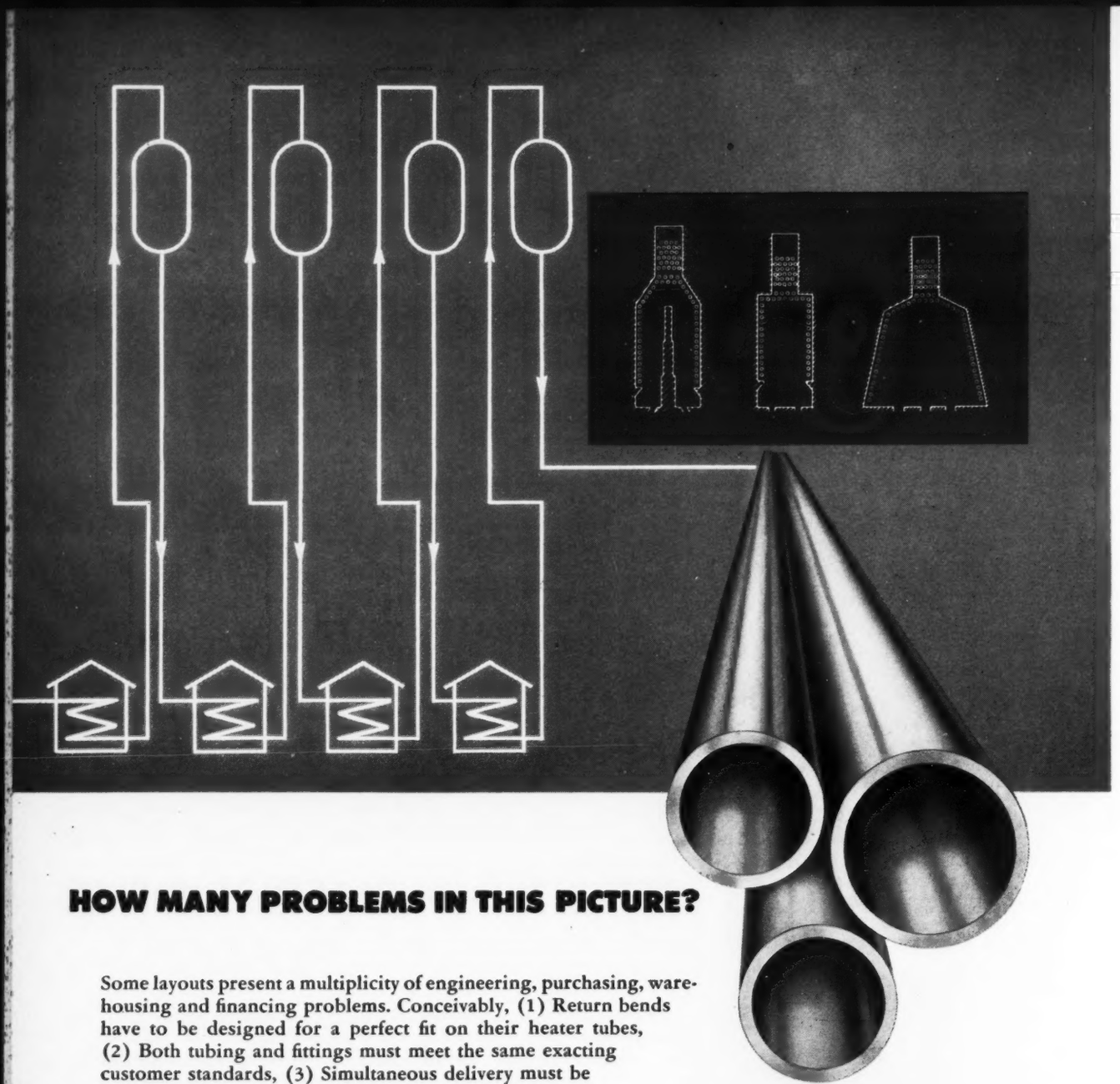
ADVANTAGES: unified structure gives greater strength; no disintegration; less gland adjustment; unusual flexibility.

LATTICE-BRAID is another important part of "the Garlock 2,000" . . . two thousand different styles of packings, gaskets, and seals to meet all your needs—the *only* complete line. That's why you get *unbiased* recommendations from your Garlock representative. Call him today or write for LATTICE-BRAID Folder AD-131.

THE GARLOCK PACKING COMPANY, Palmyra, New York
For Prompt Service, contact one of our 30 sales offices and warehouses throughout the U.S. and Canada.
**Registered Trade Mark*

GARLOCK

Packings, Gaskets, Oil Seals, Mechanical Seals, Rubber Expansion Joints



HOW MANY PROBLEMS IN THIS PICTURE?

Some layouts present a multiplicity of engineering, purchasing, warehousing and financing problems. Conceivably, (1) Return bends have to be designed for a perfect fit on their heater tubes, (2) Both tubing and fittings must meet the same exacting customer standards, (3) Simultaneous delivery must be made to guarantee erection schedules, and (4) Money tied up in material in process at any one time must be kept to a minimum.

In such a situation, it's best to depend upon Mr. Tubes for coordinated delivery of perfectly matched tubing and fittings.

Think of your own requirements in terms of the right tube for the job, tubing (or alloy pipe) and welding fittings and forged steel flanges as components of an integrated system—and you'll make B&W's Mr. Tubes a member of your team. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pa.

B&W TUBULAR PRODUCTS DIVISION

TA-6085-PP-1

Seamless and welded tubular products, seamless welding fittings and forged steel flanges in carbon, alloy and stainless steels

Immunity to chemicals advantage of rubber spray nozzles . . .

non-clogging units furnish cone spray pattern

Uses: For spraying corrosive chemicals.

Features: Nozzles are resistant to practically any chemical spray. They are non-clogging and long-wearing.

Furnishes hollow cone spray

Description: One-piece, hard-rubber spray nozzles utilize spiral design. They are available in ten models with narrow 50° angle or a wide 120° angle. Units with five different flow rates from 5 to 50 gpm are available.

(Hard rubber spray nozzles are product of Bete Fog Nozzle, Inc., Dept. CP, 309 Wells Street, Greenfield, Mass. Check 1671 on form opposite last page.)

Chemical resistance of Hypalon

Two-page bulletin on Hypalon, rubber for oxidizing service, includes table giving information on resistance of the material to a variety of chemicals. One case history on the successful use of the product is given in detail.

Pub A-2535 is issued by Elastomers Div., E. I. duPont de Nemours & Co., Inc., Dept. CP, Wilmington, Del. Specify 1672 on form opposite last page.

For more information on product at left, specify 1673 . . . see information request blank opposite last page.

STOP

PUMP

WEAR

Hard-face pump parts with the Colmonoy Spraywelder

Your pump plungers, pistons, rings, bushings—all your pump parts—will last longer with corrosion and abrasion resistant Colmonoy alloy hard-facing.

You apply these alloys fast—with the Colmonoy Spraywelder. This powder spraying unit produces smooth overlays, within .010" of desired size. They are welded to the base metal and require a minimum of finishing.

You'll save handsomely by either eliminating expensive corrosion resistant metal components, or by eliminating the time consuming hand application of hard-facing rod and the attendant difficulties in distortion and machining. Write today for more information on how you can use the Spraywelder.

HARD-FACING ALLOYS

19345 JOHN R STREET **WALL COLMONOY** DETROIT 3, MICHIGAN

CORPORATION

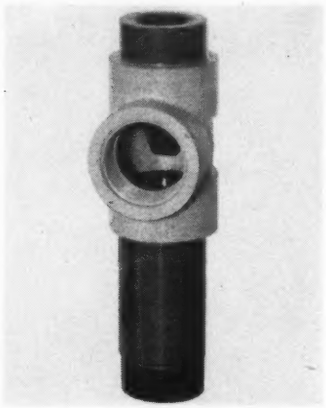
BIRMINGHAM · BUFFALO · CHICAGO · HOUSTON · LOS ANGELES
MORRISVILLE, PA. · NEW YORK · PITTSBURGH · MONTREAL · GREAT BRITAIN

When inquiring check 1674 opposite last page

Eductors and rotameters available in PVC . . .

makes units suitable for variety of chemicals

Availability of eductors and rotameters in unplasticized polyvinyl chloride enables them to be used with a wide variety of corrosive chemicals. Eductors are also available in a wide variety of corrosion-resistant metals. Rotameters are



Eductors are now available in PVC

usually constructed with PVC end fittings and Hastelloy rotor.

(PVC eductors and rotameters are a product of Schutte and Koerting Co., Dept. CP, 2255 State Road, Cornwells Heights, Bucks County, Pa. Check 1675 opp. last page.)

Bonds neoprene coatings to metal

Uses: Bonding of neoprene stocks to metal.

Features: Product minimizes or eliminates corrosion in the metal-to-neoprene interface. It may be applied by brushing, spraying or dipping.

Description: Material is composed of rubber and chemical derivatives in volatile solvent.

(Thixon NM-2 bonding agent is product of Harwick Standard Chemical Co., Dept. CP, 60 South Seiberling Street, Akron 5, Ohio. Check 1676 opposite last page.)

users say Chemiseals pay in longer trouble-free life---

Customers report unsurpassed performance in the following applications.

CONCENTRATED H_2SO_4 ACID	Aurora Pump. 1750 r.p.m. 1 1/16 inch shaft. 2 lbs. suction. 45 lbs. discharge. Temperature of medium 65°C. Not flushed.
UREA-WATER SOLUTION	Ingersoll-Rand Pump. 1750 rpm. 1 1/8 inch shaft. 2 lbs. suction. 35 lbs. discharge. Temperature of medium 100°C. Not flushed.
HYDROCARBON FEED	Labour Pump. 1750 rpm. 1 1/8 inch shaft. 10 lbs. suction, 25 lbs. discharge. Temperature of medium 102°C. Not flushed.
ADIPIC ACID and HYDROCARBON SLURRY	Labour Pump. 1750 rpm. 1 1/8 inch shaft. 35 lbs. suction, 75 lbs. discharge. Temperature of medium 70°C. Seal flushed.
UREA-NH_3 SOLUTION	Ingersoll-Rand Pump. 3600 rpm. 1 1/8 inch shaft. 10 lbs. suction, 50 lbs. discharge. Temperature of medium 75°C. Not flushed.
ESTER (10% Solids)	Byron Jackson Pump. 3600 rpm. 625 lbs. discharge. 30 lbs. suction. Stuffing box pressure 15 lbs. to 65 lbs. Temperature of medium 70°C. Seal flushed.
HYDROXYACETIC and SULFURIC ACID	Allis-Chalmers Pump. 1750 rpm. 1 1/2 inch shaft. 10 lbs. suction, 60 lbs. discharge. Temperature of medium 30°C. Not flushed.

What are your shaft sealing problems? Write for Bulletin MS-1155.

UNITED STATES GASKET CO.

CAMDEN 1, NEW JERSEY

When inquiring check 1677 opposite last page

Honor first commercial use of Lukens Nickel-Clad Steel plate

Withstands corrosive chemical for twenty-five years . . . Nickel surfaces keep this car from deteriorating . . . Nickel-cladding for the walls . . . pure Nickel for the steam coils that keep the phenol liquid.

Catalin Corporation car completes its first 25 years keeping phenol pure

These executives are honoring an important commercial event . . . the 25-year-old development of Nickel-Clad Steel plate.

They're watching while a plaque to mark the event is welded to a tank car of the Catalin Corporation of America.

Car keeps 8000-gallon shipments of molten phenol in original purity

It was built by General American Transportation Company with the first Nickel-clad plate ever rolled.

At the time, the application of this new, untried material took pioneering vision. But you can see the move was well justified. What's more, there's years of service left in the car.

Since this car was built, the use of Nickel and Nickel-Clad Steel to withstand corrosion by phenol and many other corrosive chemicals has been justified over and over again.

It has been proved in tanks, cars and trucks. In storage tanks. In evaporators, stills, condensers, driers. In piping.

You can count on it

Nickel and Nickel-Clad Steel prevent corrosion troubles . . . keep many sensitive chemicals free of harmful metallic impurities.

And you can count on Inco's Development and Research Division for help in applying these materials to specific items of equipment. Just write.

The International Nickel Company, Inc.
67 Wall Street New York 5, N. Y.

INCO **NICKEL... *for purity***

When inquiring check 1678 opposite last page

Permanently repairs severe spallage, cracks in concrete . . .

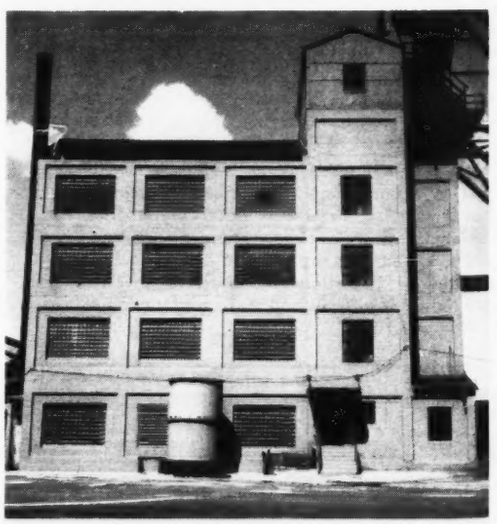
epoxy-base compound forms strong bond, is unaffected by moisture or chemicals

Uses: Compound can be used to completely restore badly cracked and spalled concrete buildings, tanks, and silos. It can also be used to make repairs of interior concrete walls. Another application is for joining concrete or clay pipe. It can be used for joining glass, glass brick, cinder or cement block where strength and corrosion resistance are required. Another application is to skidproof concrete floors or to protect masonry and metal from corrosion.

Features: Material is unaffected by concentrated HCl, NaOH, acetone, and ethyl alcohol. It has a compression strength of 45,000 psi, three times that of concrete. Tensile strength is high.

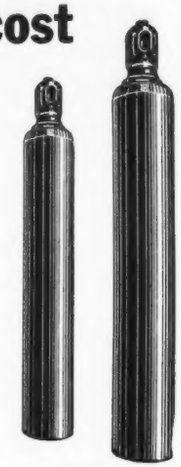
Description: Compound is an epoxy-base ma-

Badly spalled and cracked concrete walls of 4-story plant of plant in Detroit prior to restoration



Same building after repair with epoxy-base compound

Life expectancy determines a GAS CYLINDER'S actual cost



Shrewd buyers choose Harrisburg Seamless Steel cylinders for high pressure gases because they cost less in the long run. Oldest and largest manufacturer of gas cylinders, Harrisburg has, from the beginning, made durability a primary consideration. Based on Harrisburg standards, users traditionally expect a quarter century or more of service from high pressure cylinders.

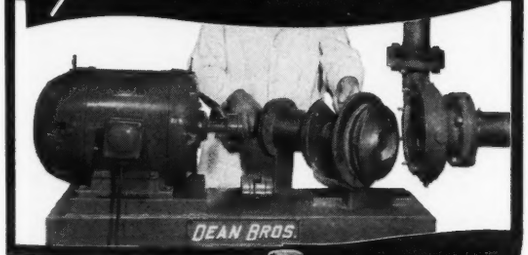
When you buy cylinders, remember that Harrisburg Cylinders are made with an eye to the future and their ability to pass successive quinquennial tests. This Company manufactures a complete range of sizes and capacities, to I. C. C. specifications, in Export and Domestic types. Send for prices and complete information.

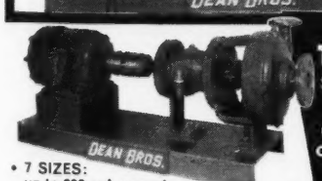
More than a century in Harrisburg

Harrisburg Steel Co. | Division of HARSCO CORPORATION | HARRISBURG 24, PENNSYLVANIA

When inquiring check 1679 opposite last page

Easy to "get at" For Inspection and Service without Disconnecting the Piping





TYPE "GS" Standard Centrifugal Pumps for . . . GENERAL SERVICE CHEMICAL SERVICE

- 7 SIZES: up to 600 gal. per min.
- TOTAL DYNAMIC HEAD: up to 275 ft.
- TEMPERATURE OF LIQUID: from −40°F to +350°F.
- Available from stock in ALL IRON, BRONZE FITTED, or STAINLESS STEEL Construction.

Write for descriptive Circular No. 190 or our recommendations for your specific pump applications.

?

WHAT DO YOU HAVE TO PUMP?

Check your jobs against this partial list being handled by

DEAN BROTHERS Type "GS" Pumps

Processes
Heat Transfer
Vacuum Systems
Reflux
Condensate Return
Small Boiler Feed
Transfer

Liquids
Water
Organic and Inorganic Acids
Vegetable Oils
Brine
Citrus Juices
Glycerine
Jet Fuel
Ammonia
Resins
Caustic Soda
Demineralized Water
Hydrocarbons
Ethyl Chloride
Soap Lye
Hexane and Oil
Benzol
Slurries

DEAN BROTHERS PUMPS INC.
EST. 1869
323 West 10th St., Indianapolis 7, Ind.

When inquiring check 1680 opposite last page

terial. Product consists of two components. Liquid catalyst is provided in compartment of container. Once this is mixed into product, material has a pot life of one-half to 24 hours, depending upon the form being used. Three different forms are available of different consistencies, depending upon particular application.

Surfaces to which coating is applied must be absolutely clean and dry. Wire-brushing or sand-

One application for material is waterproofing leaking, eroded concrete basement walls

blasting sometimes is required. Drying with a blowtorch or hot air blowers may be necessary. Material can be sprayed quickly and smoothly over any surface and worked into deep cracks and voids with a trowel. Lower viscosity form of material can be sprayed or brushed onto surface like paint. Dry sand can be mixed into compound to provide greater bulk and a mortar-like consistency. Repairs can be matched in color to the original material by mixing marble, granite, brick, or terra-cotta dust into product. Compound hardens in 8 to 12 hours normally.

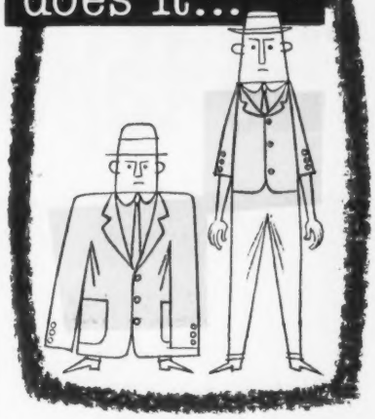
(Masonry compound is product of Permagile Corp. of America, Dept. CP, 37-23 33rd Street, Long Island City 1, N.Y. . . . or for more information reader may simply check 1681 on form which is located opposite last page.)

Shows advantages of aluminum process piping

Aluminum piping for chemical processing is subject of four-page bulletin. Comparison of costs between aluminum and other corrosion-resistant metals used for piping materials is given. Chemicals for which aluminum pipe construction has been approved are listed. Specification tables for schedule 40 and schedule 80 aluminum process pipe are included.

"Aluminum Process Piping" is issued by Reynolds Metals Company, Dept. CP, 2500 South Third Street, Louisville, Kentucky. When inquiring reader may simply check 1682 on form which is located opposite last page.

no one coat does it...



one source does

Valdura offers maintenance paints made from specific resins for every condition

EPON
VAL-CHEM. Versatile, chemical resistant metal primer for use under any finish coat. VALPON ENAMEL. Prevents damage by oils, solvents, alkalies and other chemicals on wood, metal or masonry.

PARLON
PARAVAL ENAMEL. Not affected by acids, alkalies and other chemicals. Used on wood, metal, concrete or masonry. RUBBER BASE ENAMEL. Combines excellent exterior durability with high chemical resistance.

BAKELITE
SUPER SERVICE ENAMEL. Resists chemical, moisture and abrasive conditions on metal wood or masonry. ASPHALT ALUMINUM PAINT. 98% waterproof metal coat prevents rust, rot, corrosion. Highest reflectivity.

COAL TAR
SEWAGE DISPOSAL BLACKS. Used for protecting concrete and metal surfaces from water, etc., found in sewage plants, reclamation projects, refrigeration systems, metal and concrete pipe, marine exposures.

URETHANE
URAVAL. The very latest type of coating that combines the ultimate in resistance to chemicals, solvents, marring and abrasion. Uraval will stand up where all other types of coating have failed.

ALKYD
M & F ENAMEL (General Maintenance), VALKOTE (Implement Enamel), DARYWHITE. Products that utilize the outstanding durability of alkyd resins. All these coatings are hard, tough, quick drying and color retentive.

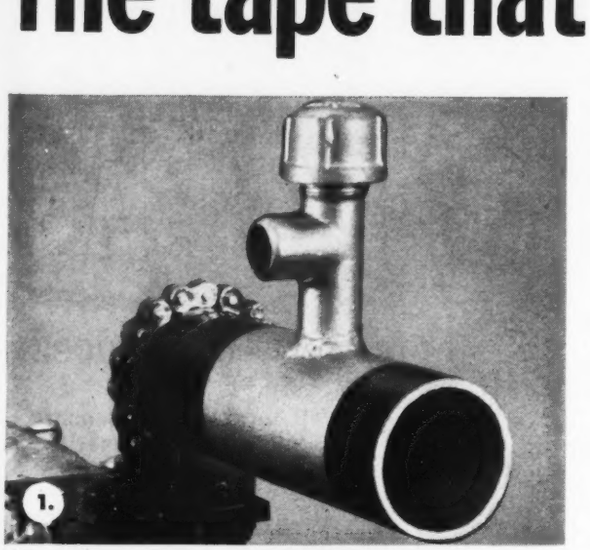
Write today on your regular letterhead for FREE catalog on all Valdura maintenance paints.

VALDURA PAINTS THAT ENDURE

VALDURA
HEAVY DUTY PAINT DIVISION
AMERICAN-MARIETTA CO.
101 E. Ontario St., Chicago 11, Ill.
687 Wellington St., Ottawa, Canada

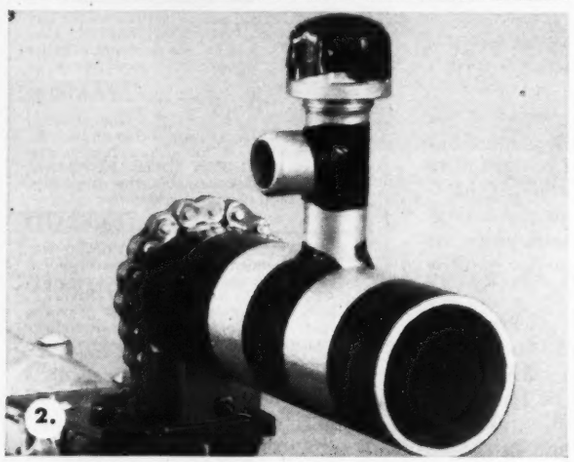
When inquiring check 1683 opposite last page

The tape that fits to a "T"



A remarkable ability to conform to irregularly shaped contours . . . plus all the advantages of polyethylene

Three easy steps in wrapping a T-joint with *Polyken* Polyethylene Tape No. 940. Note the way this highly conformable tape adapts itself to every twist and turn.



If you have pipe contour problems, this one's for you. Where you need it, it's a valuable new companion product to *Polyken* No. 900 polyethylene tape coating—the ideal coating for straight-pipe runs.

***Polyken* No. 940**—is made especially for use on valves, fittings, ells, T-joints and other irregularly shaped pipe connections. All the superb corrosion resistance of polyethylene . . . plus an extremely high degree of conformability.

No. 940 is a truly balanced product which offers the right combination of elastic memory and dead stretch. Financially, it can mean a nice saving on maintenance.

We'll be glad to figure application costs on your job. Write, wire or phone today: The Kendall Company, Polyken Sales Division, Dept. CP-B, 309 W. Jackson Blvd., Chicago 6, Illinois (WEbster 9-7100).

Complete catalog, Sweet's Industrial Construction File, Sec. 3J/Ke

Polyken®

PROTECTIVE COATINGS

THE KENDALL COMPANY
Polyken Sales Division

When inquiring check 1684 opposite last page

Explains fabrication of low-nickel, high-manganese stainless steels

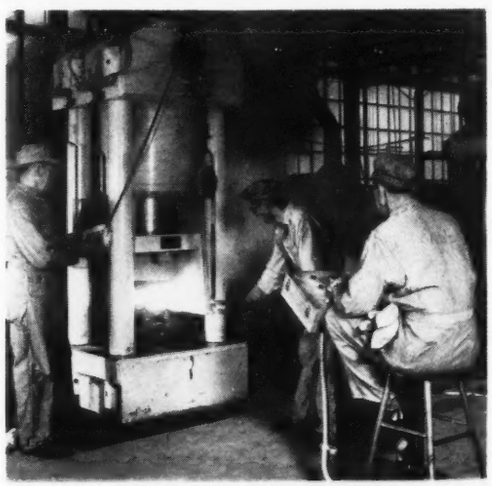
Eight-page reprint presents up-to-date information on new series 200 stainless steels. Fabrication as developed by companies using the stainless steel for products is reviewed. Comparisons are made between low-nickel, high-manganese steels and standard 18-8 steels. Actual experiments are discussed and product results are reported.

"Fabrication of Low-Nickel, High-Manganese Stainless Steels" is issued by The International Nickel Co., Inc., Dept. CP, 67 Wall St., New York 5, N.Y. Specify 1685 opposite last page.

Applications of molybdenum metal in the chemical processing and nuclear fields . . .

corrosion resistance, high mp ability to handle liquid metals are among advantages

A recent technical paper suggests that molybdenum metal should not be overlooked in the growing field of less common metals — such as titanium and zirconium — that have been found to be of considerable advantage for fabricating chemical processing equipment for specific applications. Corrosion resistance, high melting point, ability to handle liquid metals, and relatively low absorption cross section for thermal neutrons suggest many interesting applications for the metal.



Molybdenum, shown here being forged, can be fabricated by the usual metal working processes

Molybdenum (Mo) is quite resistant to hydrochloric, hydrofluoric, and sulfuric acids, and caustic under certain conditions of temperature and

concentration. It is also very resistant to many of the liquid metals even at elevated temperatures. Mo is relatively inert to carbon dioxide, nitrogen, or cracked ammonia at temperatures up to about 2000°F. Although tendency of the metal to oxidize is a disadvantage, this may be overcome in some cases by application of protective coatings and other methods.

Molybdenum melts at 4750°F, about 1800°F above that of common high temperature alloys. Modulus of elasticity is 45,000,000 psi at room temperature. Thermal conductivity is high and coefficient of expansion low. Molybdenum can be fabricated by the usual metal working procedures. The properties just discussed, that have made molybdenum of advantage for many applications in the past, hold promise for other uses in the future.

Glass

Use of molybdenum as an electrode in the resistance heating of glass has increased continuously since introduced for this use in 1943. Metal is very resistant to molten glass and does not discolor it. Uniformity of batch is improved and production increased. Stirrers, thermocouple protection tubes, orifice plates, feeding devices, and molds made from molybdenum may also be used extensively in the glass industry in the future.

Metallizing

In metallizing operations, molybdenum has the unique property of bonding perfectly to steel, Monel, nickel, cast iron, magnesium, and most aluminum alloys. It not only serves as a bonding coat for subsequent sprayed coats of another metal, but also can be used as a wear-resistant surface itself.

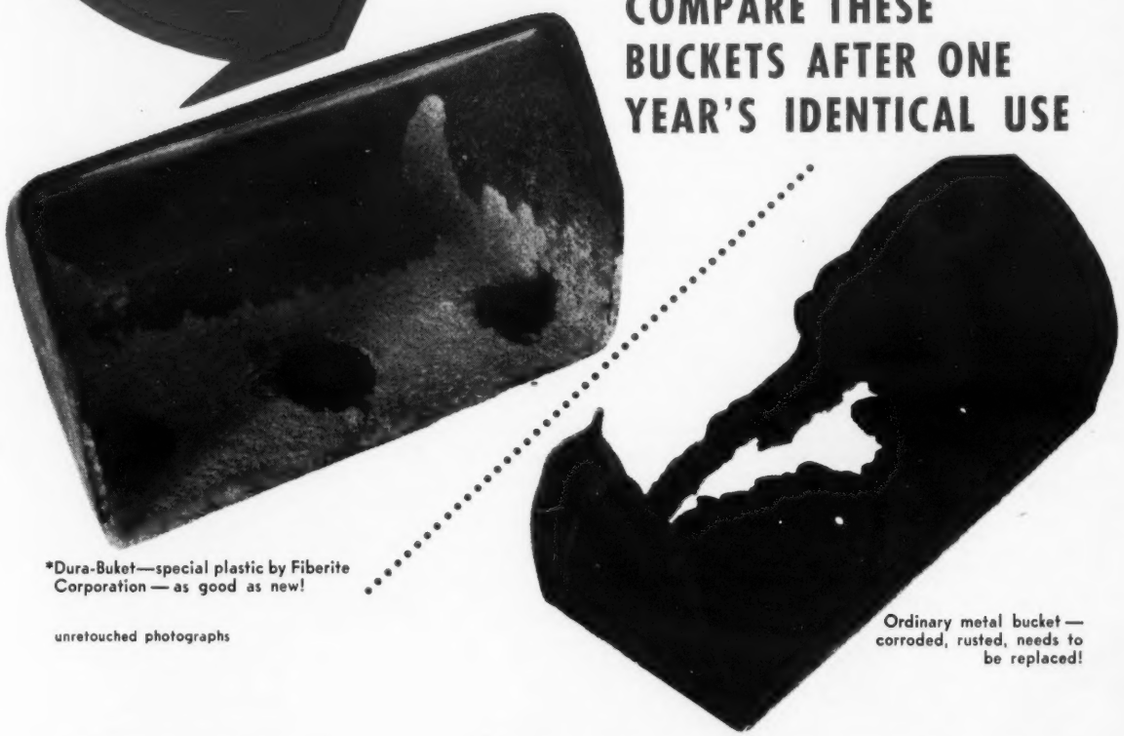
Other applications

Increased use of molybdenum in high power electronic tubes where resistance to high temperatures is required can be expected. For the same reason, the metal is employed in high-temperature furnaces operating at 2500-3100°F. In the future molybdenum equipment may be used for pumping molten metals and for die casting of brass and other high melting point alloys. In the chemical and nuclear fields, Mo may be used for heat exchangers, process piping, structural parts, and in corrosive applications.

(Condensed from technical paper, "Properties & Applications of Commercial Molybdenum and Molybdenum Alloys," which was presented at symposium sponsored by Office of Naval Research, Sept. 18-19, 1956 in Detroit, Mich. Paper was prepared by Robert F. Freeman, Manager, Arc-Cast Molybdenum Dept., Climax Molybdenum Co., Dept. CP, 500 Fifth Ave., New York, N.Y. . . . or for more information check 1686 on form opposite last page.)

No* Dura-Buket has ever worn out

COMPARE THESE BUCKETS AFTER ONE YEAR'S IDENTICAL USE



*Dura-Buket—special plastic by Fiberite Corporation—as good as new!

unretouched photographs

Ordinary metal bucket—corroded, rusted, needs to be replaced!

STRONG AND SHATTER-PROOF . . . HIGH SPEED . . . RUST PROOF . . . SPARK AND STATIC-FREE . . . SELF CLEANING . . . SANITARY . . . LONGER LIFE . . . ECONOMY

THESE two buckets were installed at the *same* time, on the *same* elevator leg. After just 12 months, the metal bucket was corroded so badly it required replacement. But the Dura-Buket is as good as new . . . will last many more years. Dura-Buket just can't rust. What's more it's *static-free*, *doesn't spark* and doesn't cake up.

Ask your mill equipment distributor for prices and sizes . . . or write to:

Dura-Buket DIVISION

NATIONAL OATS COMPANY, EAST ST. LOUIS, ILLINOIS

When inquiring check 1687 opposite last page

CAMCO

THE *Quality* LINE IN STAINLESS

"NET PRICE*" BULLETINS AND CATALOG AVAILABLE COVERING OUR FULL LINE

NP 856—150# Stainless Steel Screwed Fittings, Flanged Fittings and Flanges to MSS Standards, for standard pressure-service requirements.

XH-956-R—Forged Stainless Steel 2000# & 3000# fittings for severe pressure-temperature applications.

BW-1056—Schedules 5, 10, 40 & 80 Stainless Steel Buttweld Fittings to applicable ASA & MSS standards.

ASA-1056—Forged Stainless Steel Flanges to ASA standards.

FCS-856—Forged Lightweight Carbon Steel Back-Up Flanges for low pressure service requirements.

Catalog—Includes pressure-temperature and corrosion resistant data.

*Replaces obsolete List Price and Discount Basis to eliminate unnecessary paperwork.

CAMCO Products, Inc., 445 State Street North Haven, Conn. CP

Gentlemen — Please send literature checked below:

- ☐ ASA 1056 — Stainless Steel ASA Forged Flanges
- ☐ NP 856 — 150# Stainless Steel Pipe Fittings
- ☐ FCS 856 — Forged Carbon Steel Back-Up Flanges
- ☐ XH 956R — 2000#, 3000# Stainless Steel Fittings
- ☐ Catalog including pressure-temperature and corrosion resistant data
- ☐ BW 1056 — Stainless Steel Buttweld Fittings

Name .....

Company .....

Address .....

City ..... State .....

FILL IN AND MAIL TODAY

THE *Quality* LINE IN STAINLESS

CAMCO PRODUCTS, INC.

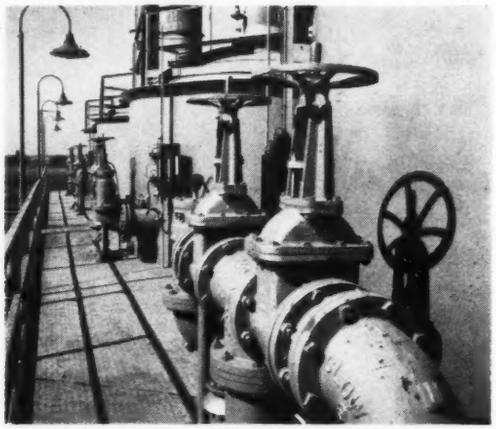
445 STATE STREET NORTH HAVEN, CONN.

When inquiring check 1688 opposite last page

Little or no maintenance on valves handling sulfuric for three years

Made from alloy especially designed to resist sulfuric acid

Eight large gate valves (8" size) have operated satisfactorily handling sulfuric acid since placed in service in September 1953 at U.S. Industrial Chemicals Co., Tuscola, Ill. Each valve handles 700 gpm of 93-98% sulfuric at 130-180°F. They are used to control the flow to four large absorbing towers in a 300-ton sulfuric acid plant. Little or no maintenance other than packing has been required on valves since they were placed in service.



Aggressive sulfuric acid has been tamed by these valves in service at U.S. Industrial Chemicals Co.

Reason valves have performed satisfactorily in the corrosive service is that they are made from an austenitic alloy, Aloyco 20, especially designed to withstand sulfuric acid attack. Composition of alloy is as follows:

Chromium	19-21%
Nickel	28-30%
Copper	3.5-4.5%
Molybdenum	2.0-3.0%
Silicon	1.5% max
Manganese	0.65-0.85%
Carbon	0.07% max

High nickel content permits alloy to contain in solid solution substantial amounts of molybdenum and copper, both of which are vitally essential for restraining sulfuric acid attack. High percentage of chromium provides adequate resistance to oxidizing media for processes where mixed acids are handled. Alloy is an induction furnace product, annealed and quenched in order to place all carbides in solid solution, assuring good resistance to grain boundary attack.

Because of its structure, the alloy withstands a wide

installation on tank truck interior shows how to

Build corrosion resistance into equipment with laminates of KEL-F® Fluorocarbon plastic

Installing a cementable laminate of glass cloth coated with KEL-F Fluorocarbon Plastic is your most practical method for preventing the corrosion of heat sensitive equipment, porous surfaces, fixed tanks, mobile equipment and existing equipment which cannot utilize popular protective measures.

This outstanding material is also ideal for preventing product contamination, for anti-sticking and electrical applications. Just consider these properties:

- extreme resistance of chemical action of acids, alkalies, oxidants and solvents
- zero-moisture absorption
- heat resistance to 350° F.
- low temperature flexibility
- high abrasion resistance and tensile strength
- low cold flow
- high impact resistance
- high dielectric strength and electrical resistivity
- non-sticking, non-toxic surface characteristics

Get the complete facts from Kellogg . . . they'll put you in touch with suppliers and manufacturers of KEL-F Plastic laminates . . . bring you up to date on the most recent developments in the field.

KELLOGG

THE M.W. KELLOGG COMPANY

Chemical Manufacturing Division
P. O. Box 469, Jersey City 3, N. J.
Subsidiary of Pullman Incorporated

®KEL-F is a registered trademark of The M. W. Kellogg Co. for its fluorocarbon products

When inquiring check 1689 opposite last page

range of corrosive media and is notably effective in either hot or cold sulfuric. Alloy has good physical properties and ready machineability.

(No. 111 gate valves made from Aloyco 20 are product of Alloy Steel Products Co., Dept. CP, 1302 W. Elizabeth Ave., Linden, N.J. . . . or for more information check 1690 on form opposite last page.)

Prevents hydrogen embrittlement of heated parts . . .

time-and-temperature indicating paint shows ± 25°F variation

Uses: For application to heat-treated parts that have been electroplated, pickled, or phosphate-treated. Unit permits visible proof that each part has been baked to relieve hydrogen embrittlement.

Features: Accuracy of paint permits it to indicate a ±25°F deviation.

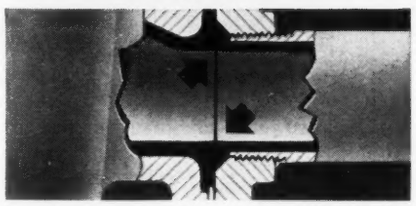
Description: Indicator paint is packaged in a handy spot applicator tube. Coating appears as a vivid red dot before baking and changes color after proper hydrogen embrittlement bake.

(Tempa-Dot indicating paint is product of Ever-Lube Corp., Dept. CP, 6940 Farmdale Ave., North Hollywood, Calif. Check 1691 opposite last page.)

"No! No! Right here it says 'a 24-inch stainless steel gate VALVE'!"

Thanks to Sherman Peeno, Procter & Gamble, Cincinnati, O.

DOW



Liquid never touches metal in saran lined pipe even at a flanged connection like this.

Saran Lined Pipe Company
2415 Burdette Avenue
Ferndale 20, Michigan
Dept. SP1596B

Please send me information on saran lined pipe, fittings and valves.

Name _____ Title _____

Company _____

Address _____

City _____ State _____

Saran Lined Pipe is Manufactured by The Dow Chemical Company, Midland, Michigan.

You can see why Saran Lined Pipe cuts corrosion costs

It's made of corrosion-resistant saran encased in non-bursting steel . . . liquid never touches metal in these installations

Here's your best way to convey acids, alkalies and other corrosive liquids—saran lined pipe, fittings, and valves. This modern piping is corrosion resistant . . . forms snug, leakproof joints . . . is available for working pressures up to 150 psi. Fittings and valves are also available in steel for working pressures to 300 psi.

Installation costs are low because saran lined pipe can be cut and threaded in the field with available pipe fitter's tools. Its rigidity means few supporting structures are needed.

Saran lined pipe has an outstanding record of trouble-free performance in many industries. THE DOW CHEMICAL COMPANY, Midland, Michigan.

YOU CAN DEPEND ON DOW

When inquiring check 1692 opposite last page

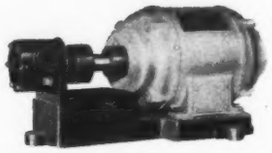
FOR HOT CORROSIVES:
ACE TEMPRON

Heat-resistant nitrile hard rubber pipe handles inorganics at 250-275 deg. F. . . also resists wide range of organic chemicals at room temperature. Sizes 1" to 8", *Bulletin 96-A.*

Only the Right piping can deliver a "GOOD RUN"

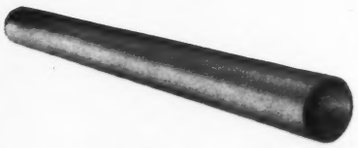
For profitable runs you must keep equipment "on stream" full time with no corrosion shut-downs. Protect your profits with Ace piping, pumps, valves, and tanks. Many rubber and plastic materials . . . backed by a century of chemical experience. Get facts today from American Hard Rubber Company.

MIGHTY MIDGET
for pumping acids



Jabsco neoprene-impeller pump made of ACE hard rubber outlasts, out-pumps anything in its pressure, size and price class. Capacity from 15 gpm. at 22 ft. head to 5 gpm. at 72 ft. head. *Bulletin 97-A.*

SENSITIVE, BUT KEEPS YOUR HEAD



TOUGH ACE-ITE PLASTIC PIPE

General-purpose moderately priced rubber-plastic pipe handles most common chemicals to 170 deg. F. . . . except few strong acids and organic solvents. Tough, odorless, tasteless. Rigid pipe ½" to 6". *Bulletin 80.*

ACE Darling Swing Check Valve . . .

lined with ACE hard rubber for the best in corrosion resistance. Large, straight-through flow areas. Sensitive to slight pressure differential. Non-slamming. Sizes 2" to 24". *Bulletin CE-52.*

ACE processing equipment of rubber and plastics

AMERICAN HARD RUBBER COMPANY
93 WORTH STREET • NEW YORK 13, N. Y.

When inquiring check 1693 opposite last page

CORROSION CONTROL

Teflon-insulated wire inert to chemicals . . .

product flexible and tough at temperatures from −265 to +260°C

Uses: Wire can be used in chemical applications for corrosive conditions. It has a variety of electrical applications.

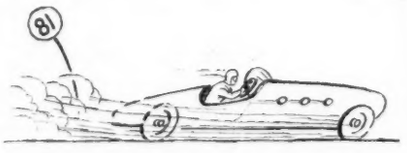
Features: Wire is capable of continuous service up to 260°C. It is flexible and tough even down to −265°C.

Description: Teflon-insulated wire is available in sizes 16 to 28 with insulation and thicknesses from .010 to .015". Wire of silver-plated copper is covered by extrusion of Teflon. It can be supplied for coding in any of sixteen colors. Wire has outstanding electrical properties.

Teflon-insulated wire is inert to almost all chemicals

Teflon covering is inert to almost all chemicals and solvents.

(Teflon-insulated wire is product of Haveg Industries, Inc., Dept. CP, 900 Greenbank Rd., Wilmington 8, Del. . . . or for more information reader may simply check 1694 on the Reader Service slip which is located on form opposite last page.)



Did you miss page 81?

Flip back for a message to all VIPs

You Pay Less...
(per month of service)
for
CHEMPRO TEFLON* PACKINGS

Long Life Chempro Teflon Packings last for many months under corrosive conditions which destroy conventional packings in days . . . even hours. Replacement cost on the basis of service life cannot be compared.

Ideal for sealing pump and other rotating shafts against acids, caustics, aromatics, chlorinated hydrocarbons and other powerful corrosives. What's more, they give a *truly tight seal* with only slight gland pressure. Their low coefficient of friction makes lubrication unnecessary. See Bulletin CP 552.

3 types...

- TEFLON RING SETS
- TEFLON V-RINGS
- TEFLON IMPREGNATED ASBESTOS RINGS

THE ORIGINAL FABRICATORS OF TEFLON* PACKINGS AND GASKETS

*duPont Trademark

CHEMICAL & POWER PRODUCTS, Inc.
9 Broadway, New York 4, N.Y.

When inquiring check 1695 opposite last page

NEW!

TUBE-TURN* "TAPER FACE" FLANGE

...cuts cost of light-duty piping

...protects low pressure pumps and valves

Tube Turns announces a new lightweight welding neck flange for service up to 125 lbs. W.O.G. pressure, offering two important cost-cutting advantages: (1) It is priced lower than conventional flanges. (2) This lightweight welding neck flange has a tapered face which affords an effective seal with reduced bolt loading; hence, permits use of steel butt welding neck flanges without danger of cracking the flat faced cast iron flanges of valves and pumps used in low pressure piping systems. Here is another result of Tube Turns pioneering research, and an example of how you get *more for your money* when you specify TUBE-TURN Welding Fittings and Flanges and buy them from your nearby Tube Turns' Distributor.

tt
TUBE-TURN

*"TUBE-TURN" and "tt" Reg. U. S. Pat. Off.

The Leading Manufacturer of Welding Fittings and Flanges

TUBE TURNS LOUISVILLE 1, KENTUCKY

A Division of National Cylinder Gas Company

DISTRICT OFFICES: New York • Philadelphia • Pittsburgh • Cleveland • Detroit • Chicago • Kansas City • Denver
Los Angeles • San Francisco • Seattle • Atlanta • Tulsa • Houston • Dallas • Midland, Texas

HOW TO SAVE

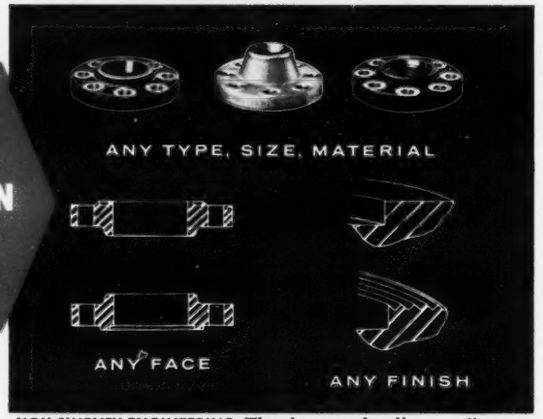
How you cut costs with
TUBE-TURN FLANGES

with the **NEW** Taper Face Flanges

CUTS FLANGE COSTS. For many applications of light-duty piping . . . up to 125 lb. W.O.G. pressure . . . the new TUBE-TURN Taper Face Flange gives rated performance at a lower price than conventional designs. Here's a good teammate for lightweight pipe and fittings in applications such as water, oil and gas distribution . . . on pumps and compressors . . . any installation where welded piping must be flanged to low pressure valves, pumps or equipment.

PROTECTS VALVES AND PUMPS. Lightweight and tapered face permit good seals with reduced bolt-loading on valve or pump flanges. Lighter, lower-priced valves can be used without danger of cracking their flat faced cast iron flanges. Also, lighter neck of flange speeds up welding to pipe.

with all **TUBE-TURN** Flanges



YOU SIMPLIFY ENGINEERING. There's a complete line . . . all types, sizes, capacities, materials. You can specify TUBE-TURN Flanges and know you'll get the exact answer to your problem. Also, Tube Turns offers you engineering help.

YOU STREAMLINE PURCHASING. Your nearby Tube Turns' Distributor provides complete-line service. This one source for all your needs in welding fittings and flanges enables you to put *all* your requirements on *one* order . . . to cut red tape, save valuable time.

MAIL FOR BOOKLET The New line of Taper Face Flanges is described in this Tube Turns booklet . . . free on request.

TUBE TURNS, Dept. KK-1
224 East Broadway, Louisville 1, Kentucky

Please send free Bulletin on Taper Face Flanges.

Company Name _____

Company Address _____

Your Name _____

Position _____

City _____ *Zone* _____ *State* _____

Available from your nearby TUBE TURNS' distributor

*"TUBE-TURN" and "tt" Reg. U. S. Pat. Off.

TUBE TURNS
LOUISVILLE 1, KENTUCKY
A DIVISION OF NATIONAL CYLINDER GAS COMPANY

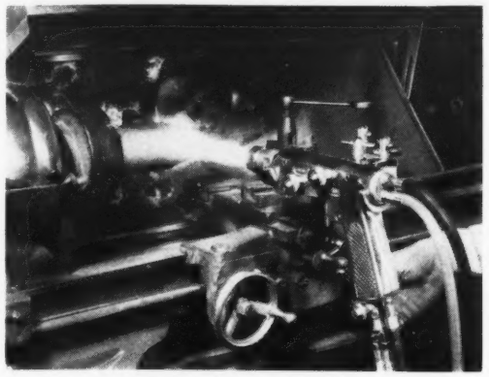
New York • Philadelphia • Pittsburgh • Cleveland • Detroit
Chicago • Kansas City • Denver • Los Angeles • San Francisco
Seattle • Atlanta • Tulsa • Houston • Dallas • Midland, Texas.

Hard-facing spray unit has high efficiency and capacity . . .

no sacrifice in quality of sprayed deposit

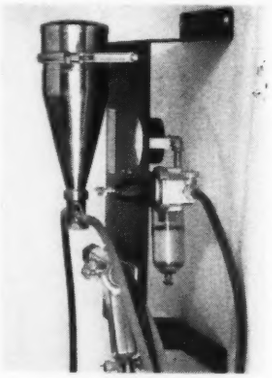
Uses: For applying hard-facing alloys and other metals in powder form.

Features: Construction of unit permits improved metal flow rates and increased deposit efficiency without any sacrifice in the quality of sprayed deposit.



Metal spraying unit in action

Description: Unit has a redesigned carburetor and spraying head. Another feature is the combination air regulator-filter. This compact assembly features a rugged regulator possessing a heavier control spring and improved diaphragm and seals. These advances produce better seating and operating characteristics, hence, more positive regulation. Filter includes a clear plastic bowl which permits visual inspection for accumulation of moisture, dirt, and oil.



Air regulator-filter has plastic filter bowl, which permits visual inspection

(Model C-2 Spraywelder is product of Wall Colmonoy Corp., Dept. CP, 19345 John R. Street, Detroit 3, Mich. Check 1696 opposite last page.)

For more information on product at left, specify 1697 . . . see information request blank opposite last page.

JACK B. RINCKHOFF (right), Chief Engineer, Sulphuric Acid & Phosphates Dept., Chemical Construction Corp., N. Y. City. Left, Michael De Piano, New York Cooper Alloy Representative.

RINCKHOFF OF CHEMICAL CONSTRUCTION

answers 3 questions on Cooper Alloy Valves

Q. Mr. Rinckhoff, in specifying equipment for the H_2SO_4 plants that Chemico constructs around the world, what Cooper Alloy valve models do you buy most of?

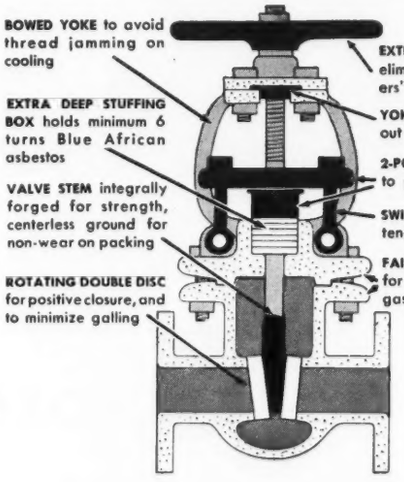
A. Over 80%, I'd say, are OS&Y type gate valves, in sizes 1"to 8"

Q. What's your most important reason for buying Cooper Alloy valves?

A. Availability. Your chain of distributors across the country and in remote parts of the world is of great importance to us. In foreign construction we have often specified Cooper Alloy because of this all-important availability.

Q. What about design and quality?

A. Vital. Valve design determines performance, and our specifications are rigid. As a construction company, we can't afford to jeopardize our reputation by installing questionable equipment. Cooper Alloy valves have passed our tough specs, and have my approval for all severe construction applications.


BOWED YOKE to avoid thread jamming on cooling
EXTRA DEEP STUFFING BOX holds minimum 6 turns Blue African asbestos
VALVE STEM integrally forged for strength, centerless ground for non-wear on packing
ROTATING DOUBLE DISC for positive closure, and to minimize galling
EXTRA LARGE HANDWHEEL to eliminate need for "persuaders"
YOKE NUT REPLACEABLE without valve disassembly
2-PC. GLAND CONSTRUCTION to prevent scoring of stem
SWINGING EYEBOLTS for maintenance convenience
FAIRED BODY-BONNET FLANGES for equal stress and uniform gasket loading

A VALVE DESIGNED FOR STAINLESS!

The Cooper Alloy valve is not an adaptation of earlier brass and iron patterns. Cooper Alloy, with over 35 years of experience in handling stainless steel, created a valve *designed to be cast in stainless!* **Check the Special Design Features shown at left.**

As the little CA man below is saying: *"You can tell a Cooper Alloy Valve as far as you can see it!"* Write today for *your* copy of our folder "Design Factors In Stainless Steel Valves." The Cooper Alloy distributor near you will be glad to show you the complete line of Cooper Alloy valves *and fittings*, and their advantages. He can serve you promptly from local stocks.

COOPER ALLOY

Corporation • Hillside, New Jersey

VALVE & FITTING DIVISION

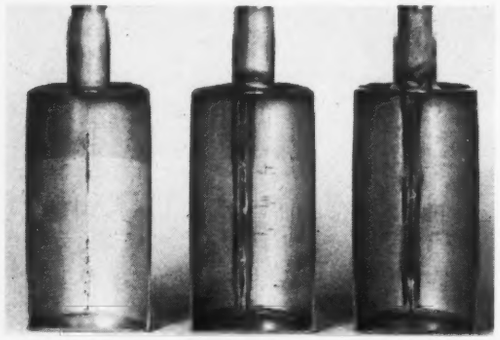
THIRTY-FIVE YEARS OF STAINLESS STEEL PIONEERING

When inquiring check 1698 opposite last page

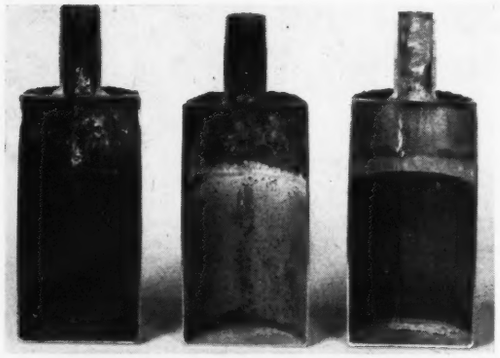
Complete-mix liquid fertilizers do not attack chromium-nickel stainless steels . . .

laboratory corrosion tests show alloys unharmed after 28 days exposure

Recent technical paper reports that only the chromium-nickel stainless steels were not measureably attacked among alloys and metals tested in complete-mix liquid fertilizer solutions in a recent investigation.



Inside of three Type 302 stainless steel test tanks after 28 days exposure to complete-mix fertilizer solutions at 135°F

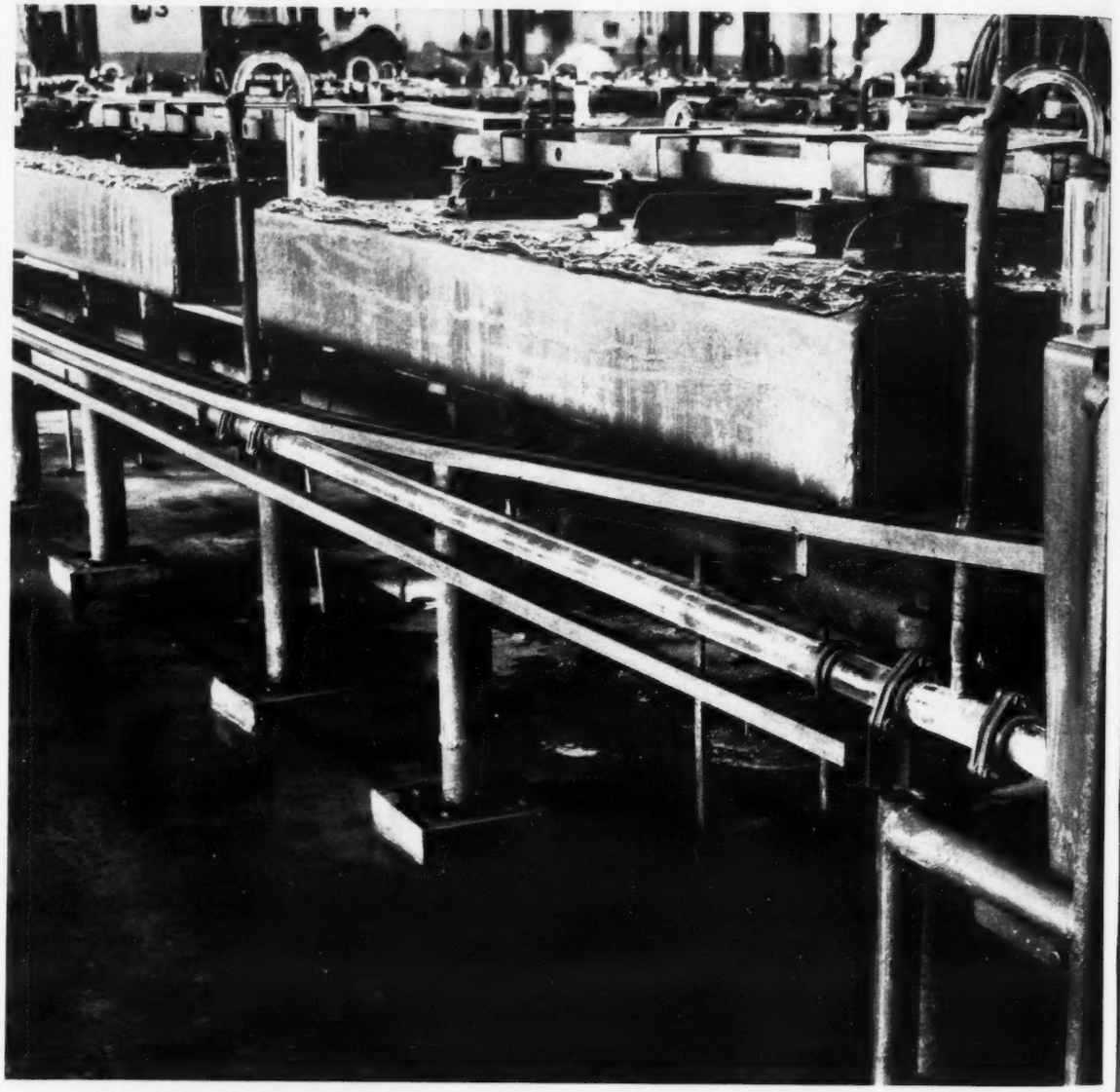


Inside of AISI 1010 carbon steel test tanks after 28-day test with complete-mix fertilizer solutions at 135°F

Simulated service tests indicated that stainless Types 302, 304L, and 316L were suitable for storage and application equipment handling complete-mix fertilizers, which are becoming of increasing interest. The three primary plant foods — nitrogen, phosphorus, and potassium — are contained in complete-mix liquid fertilizers. However, these solutions are difficult to handle since they may contain varying amounts of phosphoric acid, ammonia, potassium chloride, urea, and ammonium nitrate.

Alloys and metals investigated in complete-mix solutions were tested in two ways. One was by partial immersion of small specimens in flasks containing the fertilizer solutions. The other method was a simulated service test in which small tanks (about

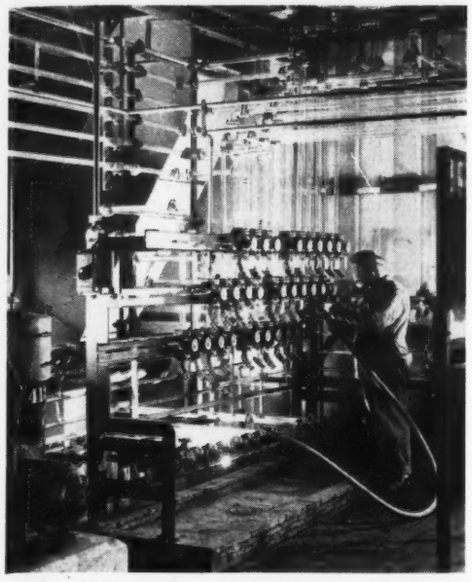
$6.32 annually covers chlorine



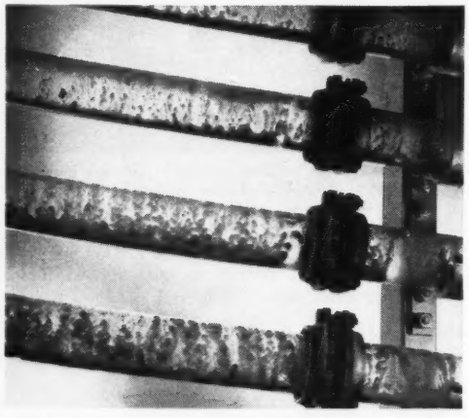
Brine feeder lines and spent brine lines connected to Ecusta Paper Division's Sorenson-type chlorine cells are of PYREX brand glass pipe. After nearly a decade of use, lines show no corrosive damage. PYREX pipe turns in unusually low cost-per-year-of-service as a matter of routine. Cost for all maintenance is practically nil.

CORNING GLASS WORKS

producer's maintenance bill for 1600 feet of PYREX brand glass pipe



Low initial cost, low maintenance cost and installation by your regular plant pipe fitters. Even pipe fitters who have never seen glass pipe before, set it up easily with our Field Fabrication Kit. Approximately 70% of glass pipe users do their own installation.



Corrosion or Contamination? Handling metal-sensitive fluids and those easily contaminated can be as much of a problem to you as corrosives. Inert, easily cleaned PYREX pipe protects sensitive chemicals like dyes, pharmaceuticals. Transparency lets you check pipe contents visually, too, for extra safety.

Lines show no corrosion after 9 years of exposure to brutal corrosive

Is your pipeline maintenance excessive?

How long should corrosion resistant pipe last?

Perhaps you can get answers to these two questions by comparing your plant history with that of the Ecusta Paper Division of the Olin Mathieson Chemical Corporation.

The Pisgah Forest, N. C. plant produces chlorine for their pulp and paper mill.

In 1947, Ecusta Paper installed 1½" glass pipe as brine feed lines, and 2", 3", and 4" glass pipe as spent brine lines.

Total cost for all glass line maintenance in the nine years to date amounts to $56.90, or $6.32 yearly. And the lines show no sign of corrosion, promise years more of positive corrosion resistance.

Rockbottom maintenance costs like this aren't common to all corrosion resistant pipe, nor is such a degree of resistance to corrosive attack. Yet users of PYREX brand pipe have been making such reports as a matter of course for over 20 years. The materials they pipe include some of the most corrosive chemicals in existence, like chlorinated hydrocarbons, all acids except HF, strong bases at low temperatures and weak bases at high temperatures.

If you handle corrosives, you will never know how little you can spend for maintenance and replacement until you install PYREX brand pipe. Even a few lengths of test lines will help to prove the case for you. Our representatives will gladly work out a test setup with you, and you call the terms on operating conditions.

Or, if you'd rather, we'll gladly furnish the names of PYREX pipe users near you and arrange a plant visit so you can get your own case history facts first hand. In the meantime, write, wire or phone us for the worthwhile reading described in the coupon.

CORNING GLASS WORKS, 32 Crystal Street, Corning, New York

Please send me the following Bulletins: EA-1, "PYREX brand Glass Pipe in the Process Industries" ☐; EA-3, "PYREX brand 'Double-Tough' Glass Pipe and Fittings" ☐; PE-3, "Installation Manual for PYREX brand 'Double-Tough' Glass Pipe" ☐.

Name..... Title.....

Company.....

Street.....

City..... Zone..... State.....

Corning, New York

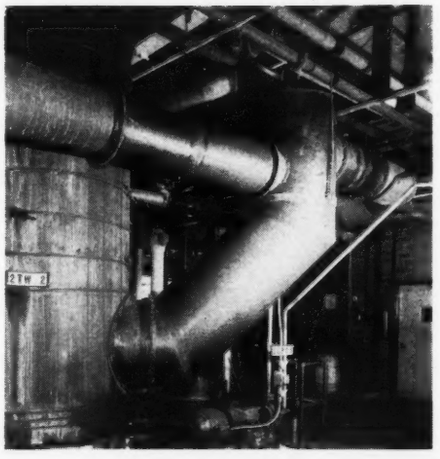
Corning means research in Glass

600 ml capacity) of each material to be tested were fabricated by welding and then partially filled with fertilizer solution.

Only stainless Types 302, 304L, and 316L were unattacked by all of the eight complete-mix fertilizer solutions used in the simulated service tests.

(Condensed from technical paper, "Corrosion of Metals by Liquid Fertilizer Solutions," which was presented before the 1956 Annual Meeting of the National Association of Corrosion Engineers in New York City. Paper was published in the Nov. 1956 issue of Corrosion. It was prepared by D. C. Vreeland and S. H. Kalin, Applied Research Laboratory, U. S. Steel Corp., Monroeville, Pa.)

(For further information on stainless steel for fertilizer solutions contact U. S. Steel Corp., Dept. CP, 525 William Penn Place, Pittsburgh 30, Pa. . . . or check 1700 on form opposite last page.)



Glass fiber-plastic ducts withstand wet chlorine

PROBLEM: Ducts up to three feet in diameter made from two different corrosion-resistant metals lasted only three to four months handling corrosives at a chemical plant. Chemicals encountered included wet chlorine, hydrogen bromide, and hydrochloric acid used in combination with organic solvents. Operation involved was an intermediate step in the production of dyes.

SOLUTION: Plant installed ducts made from polyester, reinforced with glass fiber.

RESULTS: Ducts are still in excellent condition after three years of severe service.

(Fiberglas is product of Owens-Corning Fiberglas Corp., Dept. CP, Toledo 1, Ohio . . . or check 1701.)

(Plastic duct system was engineered by duVerre, Inc., Dept. CP, PO Box 97, Hamburg, N. Y. . . . or check 1702.)

When inquiring check 1699 opposite last page

Inside Story on POWELL CORROSION RESISTANT VALVES

Corrosion resistant valves may appear to be alike on the outside. But inside -- in trim materials, in design, in manufacture -- there can be a world of difference. And the inside story of Powell Corrosion Resistant Valves is that every valve has PERFORMANCE VERIFIED.

The reason there's a big difference in Powell Corrosion Resistant Valves is quality control. It begins not with manufacture -- but with the very materials which go into Powell Valves. As a final step of Powell's rigidly enforced quality control, every Powell Valve is subjected to an actual line test.

Powell has designed many new types of Corrosion Resistant Valves to meet the needs of the rapidly expanding chemical and process industries. The variety of pure metals and special alloys in which they are available has grown to such an extent that today there is a Powell Corrosion Resistant Valve to control the flow of almost every known corrosive fluid.

Consult your Powell Valve distributor. If none is near you, we'll be pleased to tell you about our COMPLETE quality line which has PERFORMANCE VERIFIED.

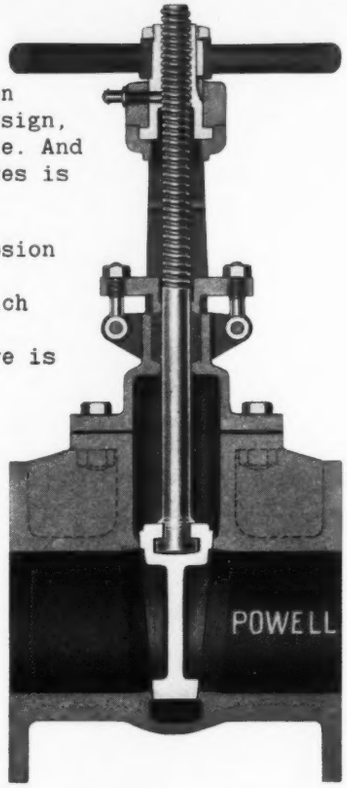


Fig. 2453-SG -- Stainless Steel O. S. & Y. Gate Valve for 150 Pounds W. P.

Fig. 1314-A -- 1500 Pound Integral Bonnet Alloy Steel "Y" Valve.

Fig. 2342 -- Alloy Steel Bolted Cap Swing Check Valve for 150 Pounds W. P.

PERFORMANCE PV VERIFIED

The Wm. Powell Company, Cincinnati 22, Ohio . . . 111th YEAR

POWELL VALVES

BRONZE, IRON, STEEL AND CORROSION RESISTANT VALVES

When inquiring check 1703 opposite last page

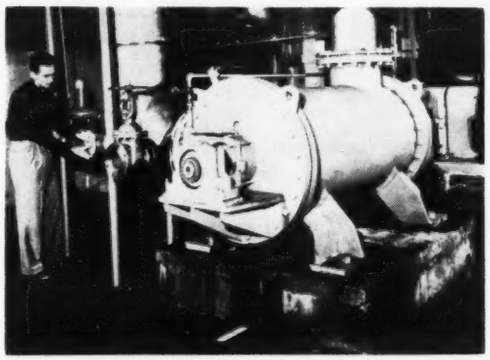
Cut ClO_2 corrosion of mixer in wood pulp bleaching with titanium lining . . .

no apparent corrosion or pitting has occurred during five months service

Problem: Chlorine dioxide used in bleaching wood pulp at Riegel Paper Corp., Acme, North Carolina, caused serious pitting and corrosion of mixers. Several metals and alloys, including stainless steel and a chrome-nickel-molybdenum alloy, were tried as fabricating materials and as linings. Although service life was increased, resistance to corrosion was not satisfactory.

Mixers handle a mixture of wood pulp and a chlorine dioxide solution. Concentration of ClO_2 gas in pulp is 0.2 to 0.5%, expressed as gas weight to weight of air-dry pulp.

Solution: As a result of laboratory corrosion test, titanium lining was installed in one mixer in December of 1955. Lab test involved exposure of test sample in liquors containing 4 to 7 grams per liter of chlorine dioxide for 93 days at ambient temperature. A corrosion rate of less than 0.02 mils per year was indicated.



Titanium-lined mixer handles mixture of chlorine dioxide solution, wood pulp without corrosion, pitting

Titanium was used to line only barrel of unit, where abrasion and pitting corrosion were most severe.

Results: Mixer was examined after five months service, during regular plant shutdown. Lining was completely free from pitting, and no apparent corrosion had occurred. Unit was returned to service and is expected to last several years longer than any previous installation.

(A-70 titanium alloy for mixer was supplied by Rem-Cru Titanium, Inc., Dept. CP, Midland, Pa. . . . or for more information check 1704 on form opposite last page.)

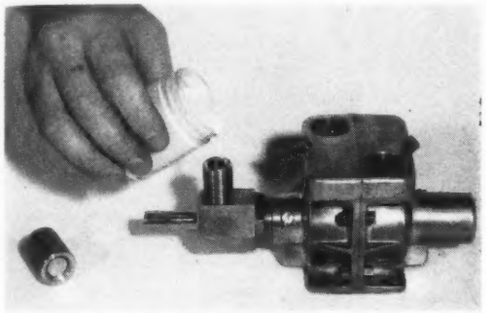
(Mixer was fabricated by Improved Machinery Inc., Dept. CP, Nashua, N. H. . . . or for more information check 1705 on form opposite last page.)

Fluid Teflon shaft seal available for rotary chemical pumps . . .

seal resists corrosives, minimizes friction, prevents shaft scoring

Uses: For pumping small volumes of such difficult-to-handle liquids as carbon tetrachloride, hot lubricating oils, and dilute sulfuric acid at high temperatures.

Features: Lubricating qualities of Teflon minimize friction and prevent shaft scoring. Chemical



Liquid Teflon seal is arranged as an annular chamber around pump shaft

inertness of Teflon makes the seal resistant to the corrosive or solvent action of a wide variety of chemicals.

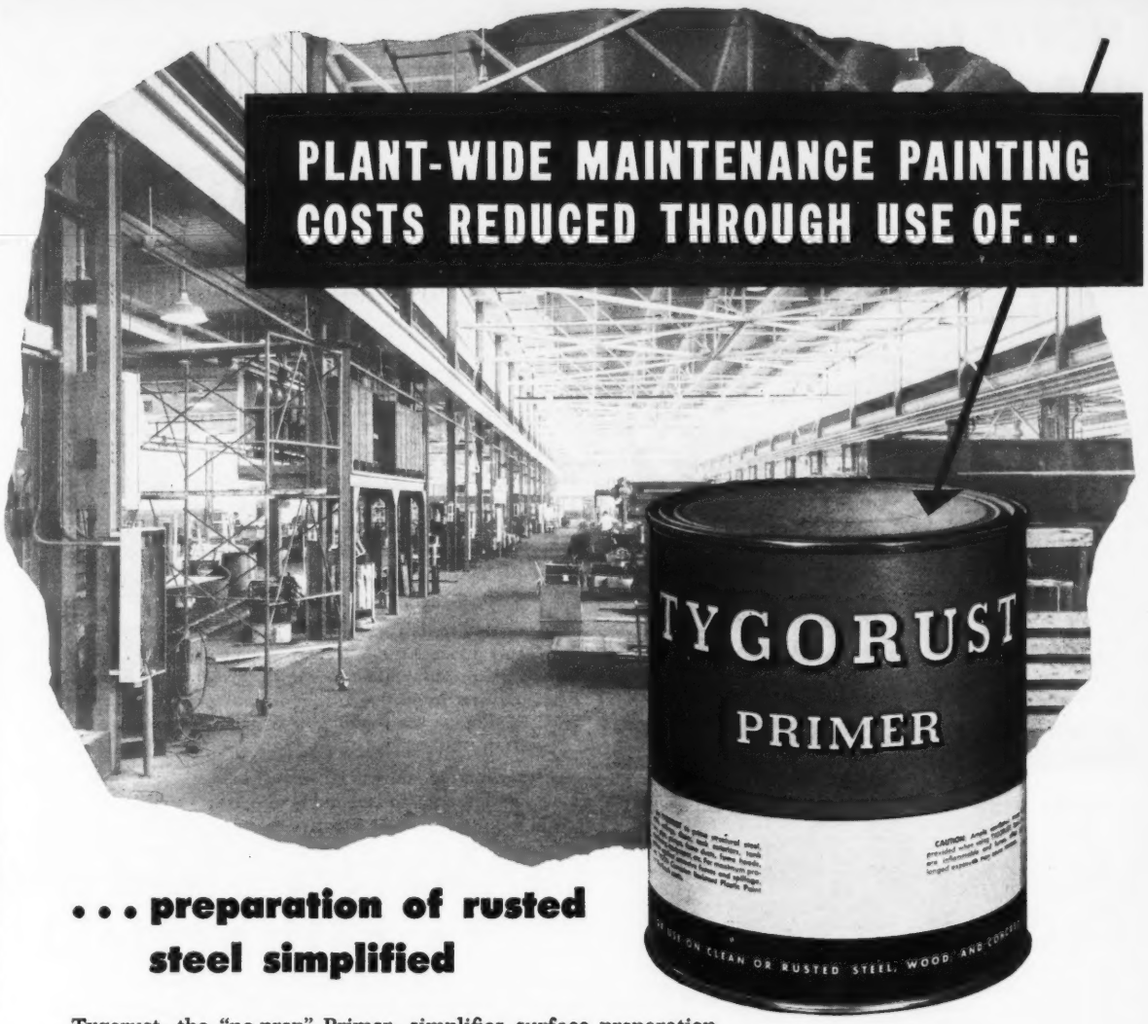
Description: Seal is arranged as an annular chamber around the pump shaft, in which two Teflon seal-ring retainers hold a fluid mass of Teflon. Screw-in piston provides positive pressure on the fluid seal, making a close fit which effectively eliminates passage of gases or fluids in or out of pump. Seal has been tested against heads up to 100 psi and vacuums to 28 inches. Seal can be added to pumps already in this field.

(Fluid Teflon seal for rotary pumps is product of Eco Engineering Co., Dept. CP, 12 New York Ave., Newark 1, N.J. . . . or for more information check 1706 on form opposite last page.)

Resistance tables, flow rate charts for PVC fittings, pipes, valves

Complete data on company's line of unplasticized polyvinyl chloride pipe, fittings and valves are given in 16-page catalog. Physical properties, chemical resistance tables, dimensions, flow rate charts, and assembly and installation data are covered.

"Van-Cor 1 and Van-Cor 2" is issued by Colonial Plastics Mfg. Co., Subs. of Van Dorn Iron Works, Dept. CP, 2685 E. 79th St., Cleveland 4, Ohio. Specify 1707 on form opposite last page.



PLANT-WIDE MAINTENANCE PAINTING COSTS REDUCED THROUGH USE OF...

. . . preparation of rusted steel simplified

Tygorust, the "no-prep" Primer, simplifies surface preparation in dozens of applications throughout the average plant contributing substantial savings in time and labor. Sandblasting rusted steel, for example — or drying out damp concrete . . . these operations, formerly considered essential before priming could be started, are no longer necessary. In most cases rusty steel need only be wire brushed before priming with Tygorust. Old concrete, damp or dry, may be Tygorust-primed after simply brushing off dirt and loose particles.

Tygorust Primer can be brushed or sprayed and gives economical coverage. It may be applied over firmly adhering old paints (excepting bituminous coatings), and provides excellent adhesion for any type of finish including vinyl-base coatings. Tygorust stops underfilm rust-creep and, through superior adhesion properties, aids in maintaining paint films in top condition. Try Tygorust as a general purpose primer . . . and start a new cost sheet, because Tygorust is one logical method of keeping maintenance painting costs down.

432-E-

HELPFUL HINTS ON MAINTENANCE PAINTING

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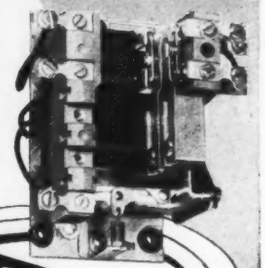
LIQUID LEVEL and INDUSTRIAL CONTROLS



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Strain-gage flow transducer with panel-mounting flow indicator

Meters fluid flow to half-percent accuracy—

even with transients and pulsations

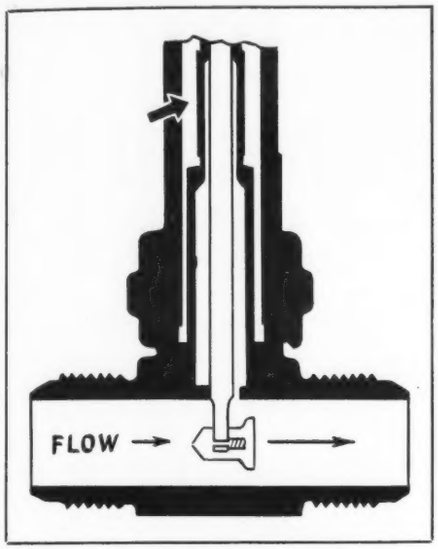
Adapted from aircraft field, strain-gage flow meter is sensitive, rugged; handles slurries, fluids with entrained air or suspended solids

Uses: Flow transducer is accurate and sensitive fluid-flow meter for nearly any liquid that can be contained in stainless steel. Can be used for highly accurate flow measurement of slurries or liquids holding entrained air or suspended solids . . . even under transient and pulsating flow conditions and with high-speed recording equipment.

Features: Flow transducer meters fluid flow with high accuracy. Electrical translation produced by bonded-strain-gage element is stable and sensitive, yet provides an accuracy of better than ½%. In many cases, accuracy is only limited by ability of accessory indicating and recording equipment.

Description: Flow meter operates by sensing drag force on body suspended in fluid stream. Mechanical stress is transmitted by lever rod and torque tube to strain-gage bridge. Proportional electrical output may be telemetered for miles over existing systems if necessary.

Originally developed for aircraft field, instrument will operate in any position. It is virtually unaffected by changes in fluid temperature or static pressure head, within design limitations of unit — 1000 to 5000 psi and 300°F. One limitation on



Cutaway drawing of flow transducer. Flow sensor is fixed. Strain gages (arrow) develop output signal

use of transducer is that care must be taken to keep electrical connector clean and moisture-free. Use of a silicone moisture-proofing compound is usually adequate. Under conditions of extreme dampness or corrosive atmospheres, complete connector can be wrapped with several layers of rubber tape and then coated with a synthetic rubber compound.

Not having any moving parts, instrument should be relatively maintenance-free and capable of fluid-flow measurements under difficult conditions. Flow surges better than 150% of calibrated limits can occur before causing a permanent zero shift. Even then, since force sensing element is linear, only zero point need be reset. Except for extreme conditions, recalibration is not generally required.

Extremely high frequency response, to 100 cycles per second, allows observations to be made of flow transients and pulsations. Readability of signal produced is developed by expanding the scale to include only area of desired measurement, utilizing a flow range ratio of approximately 10 to 1.

A calibration curve is supplied with each instrument whenever overall accuracy of approximately 1½% is adequate. Through simple calculations, flow calibration curve can be correlated with user's recording or indicating device — without a direct flow calibration.

Extreme accuracy can be realized when an actual mass or volume flow versus time calibration is made under operating conditions. After cancelling

(*Please turn to next page*)

How to simplify control problems

Keep systems flexible, carry small inventory, cut maintenance cost with the **Bailey Building Block Method** of instrumentation and control.

What is the Bailey Building Block Method? It's using standardized Bailey measuring, transmitting, and controlling components and combining them into any system you need. Components can be added as needed . . . removed and reused elsewhere . . . recombined into another system when the need changes. It's flexibility plus!

It's all based on the simple fact that a Bailey instrument or control component doesn't care if the measured variable is steam flow, tank level, or tower temperature, to pick just three examples. System components—transmitters, receivers, relays, selector stations, power units—are standardized for multi-purpose use.

A spare component can be used in any one of many systems. Gone are delays waiting for shipments of special parts. Gone are large inventories of spares and parts. Simplified is the training of men for maintenance.

There are many exclusive features and advantages of the individual components used in the Bailey Building Block Method. And there's much more to the Building Block story itself.

For further details, call our local district office or write us at Cleveland. Our engineers will be glad to prove how the Building Block approach will save you money and simplify your instrument and control problems.

G36-1

BAILEY BUILDING BLOCK METHOD

BAILEY METER COMPANY
1074 IVANHOE ROAD, CLEVELAND 10, OHIO
In Canada—Bailey Meter Company Limited, Montreal

RESULTS IN: FLEXIBILITY, SIMPLICITY, ECONOMY

BAILEY METERS

When inquiring check 1711 opposite last page

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Through the use of a THERMAL High Velocity burner production for a given size furnace can be substantially increased or furnace size for a given rate or production can be decreased.

high velocity burners by THERMAL

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(2) Convection is a predominant means of heat transfer.

(3) High exit velocities (300 to 500 ft/sec) of products of combustion.

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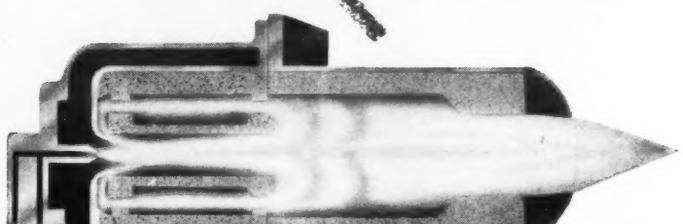
(6) Flame length, regardless of fuel used is seldom more than one foot in length.



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When inquiring check 1712 opposite last page

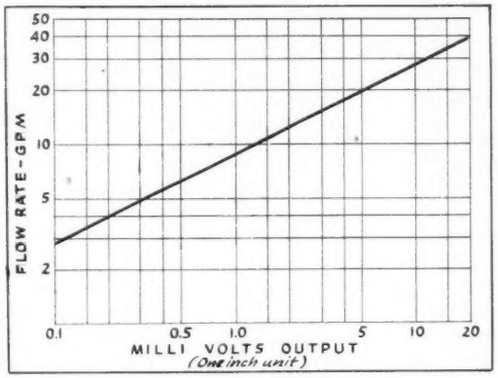
Strain-gage Flow Meter

(*Continued from preceding page*)

out all errors of the measuring system, flow translation to ½% of calibration point can be expected. However, such accuracy requires stabilization of amplifiers, true fluid density, and other corrections.

Unusual design of instrument not only allows measurement of rate of flow in either direction but also indicates exact direction by polarity of output signal. Direct reading low-cost indicator is available for installations not requiring accuracy better than 1½%.

Electrical system of transducer is completely compatible with commercially available strain-gage recording, indicating or control system. All parts exposed to measured fluid are 18-8 stainless steel, Teflon, or Kel-F. Four models cover range from 0.1 to 120 gpm with a basic flow range of 10:1 in any one unit. Within limits, flow range can be varied by installation of another sensor. Standard line sizes are available for ½, ¾, 1, and 1¼" AN tubing. Instruments are available for pressure ranges to 5000 psi. Recommended operating temps are from −65° to 225°F (300°F maximum).



Typical flow curve of one-inch unit — flow rate in gpm with millivolts output

Electrical input required is 5 to 10v AC or DC. Output is 20 mv max or 2.0 mv per volt input for full range of flow. Strain-gage bridge is 120-ohm four-active-arm circuit.

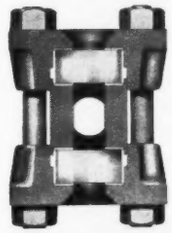
(Mark V flow transducer is product of Ramapo Instrument Company, Inc., Dept. CP, One Dey Lane, Riverdale, N.J. Check 1713 opp. last page.)

Your guide . . . to more instrumentation and control ideas and equipment is the alphabetical product directory beginning on page 221

Strahman

HIGH PRESSURE GAUGES

USED IN **REFINERIES** *AND* **CHEMICAL PLANTS** *THROUGHOUT THE WORLD*



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STRAHMAN VALVES, Inc.
16 Hudson St., New York 13, U.S.A.

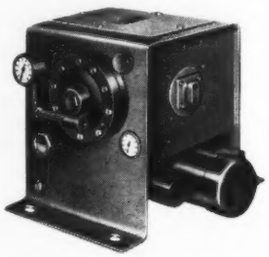
When inquiring check 1714 opposite last page

More compact web-edge guide is easier to install . . .

has self-contained regulator, motor, pump, and oil supply; is for light-duty service

Uses: To laterally position a moving web or strip of material in rubber, plastics, textile, and paper converting fields. Can also be used to position a tool, knife, marker, or other piece of equipment in relation to moving edge position.

Features: Edge guide unit is more compact than previous model of manufacturer and has been designed for lighter duty service. Unit is relatively low cost.

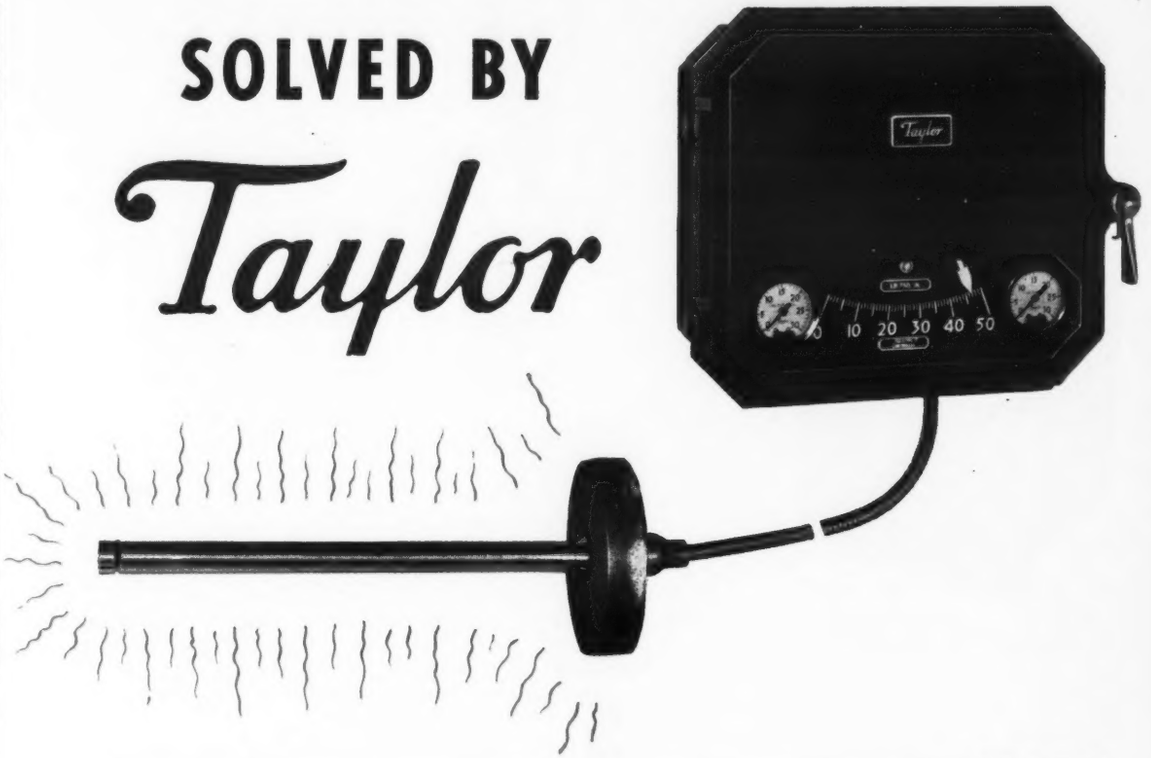


Compact edge guide is easy to install, saves space

Description: Web-edge guide has self-contained regulator, motor, pump, and oil supply. Unit will handle rolls up to 2000 pounds in weight where traveling speed of the web is not excessive. Larger model must be used in applications where traveling speed is high, weight is large, and correction rate must be relatively fast.

(Model 550 edge guide is product of Askania Regulator Company, Subsidiary of General Precision Equipment Corporation, Dept. CP, 240 E. Ontario St., Chicago 11, Ill. . . . or for more information check 1715 on form opposite last page.)

ANOTHER RED HOT PROBLEM SOLVED BY Taylor



Accurate measurement of process *pressures* at temperatures up to 1500° F.

THE RED portion of this picture shows another example of Taylor ingenuity at work. It's a volumetric pressure measuring system for use at extremely high temperatures. Although designed primarily for atomic energy applications, it has since been adapted for a variety of applications in measuring pressures of liquid metals.

Built to meet tremendously severe requirements, this system will measure pressures at temperatures up to 1500°F., *to the accuracies usually associated with measurement at atmospheric temperatures.* And it will measure short ranges that would be subject to considerable error with conventional systems.

Seventy-five of these units have been installed to date, and all are working satisfactorily . . . a tribute indeed to the vision and ingenuity of Taylor engineers and the dependability of instrumentation bearing the Taylor name.

Whether or not *your* instrument problem has anything to do with measuring pressures of molten metals, it's probable that we can find the answer. Just call your Taylor Field Engineer, or write Taylor Instrument Companies, Rochester, N.Y., or Toronto, Canada.

Any length of span is permissible between the limits of 50 and 600 psi. Suppression of 100% up to 0-300 psi. The system shown uses a 5-ply corrugated diaphragm, 4" O.D. In addition to the Taylor indicator shown above, it can be used with recorders, controllers and dial type indicators.

Instruments for indicating, recording and controlling temperature, pressure, flow, liquid level, speed, density, load and humidity.

Taylor Instruments
MEAN
ACCURACY FIRST
IN HOME AND INDUSTRY

When inquiring check 1716 opposite last page

Saturable reactor, thyratron combined in controller . . .

off-on operation incorporates time-proportioning

Uses: For non-indicating control of temperatures from a range of 0 to 400°F to 0 to 2400°F. Centigrade calibrations are also available.

Features: Instrument compares voltage from sensing element to a

Dimensions of controller are approximately 8 x 8 x 8 inch

standard voltage. Difference is amplified by a saturable core reactor and used to control heating through an electronic relay.

Description: Potentiometer controllers are designed for use in batch processing. By comparing voltage from sensing element to reference voltage they obtain a difference which is amplified by saturable core reactor and a thyratron. When voltage output of sensing element reaches the same value as standard voltage, no current flows to the reactor. This cuts off thyratron and de-energizes output relay.

While control is on-off, a time constant network within the instrument causes the control device to go to the "off" position slightly before the normal "off" point is reached. Same procedure is followed during "on" cycle. This anticipatory action starts when control temperature comes within the portioning band of the instrument — about one percent of scale range to either side of

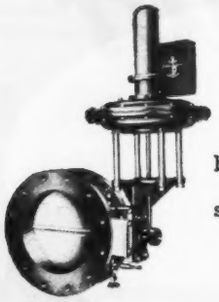
Needle Valves

Rugged, outstanding performers for proportional control of small flows. Interchangeable seat rings and plugs. For water, gas, steam, chemicals. Trim and body materials available for "difficult" fluids. Shown here with unique *reversible* Stabilflo Motor.

GET THE BEST

Saunders Type Valves

A complete line, particularly suited to handling of highly corrosive fluids, or fluids containing solids in suspension. Available with Stabilflo Motor as shown, or with Stabiload Cylinder and Power Positioner.

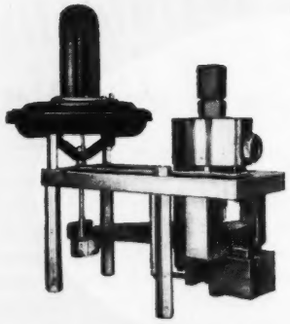


Butterfly Valves

Light and heavy duty types, with angle or swing-through seating, in spool or wafer body style, for low pressure air, gases in combustion control, steam, high pressure gases and liquids, etc. Available with Stabilflo Motor (shown) or cylinder operator.

Gate Valves

Guillotine-type slide valves, specially designed to handle pulp fibre, slurries, and similar fluids. Available with Stabiload Cylinder and Power Positioner as illustrated, for throttling service, or with 4-way pilot valve for on-off service.



Super-Pressure Valves

For throttling or let-down service up to 30,000 psi. Features an exclusive high-pressure bellows seal. Port sizes and connections to meet high pressure process specifications.

FOXBORO CONTROL VALVES

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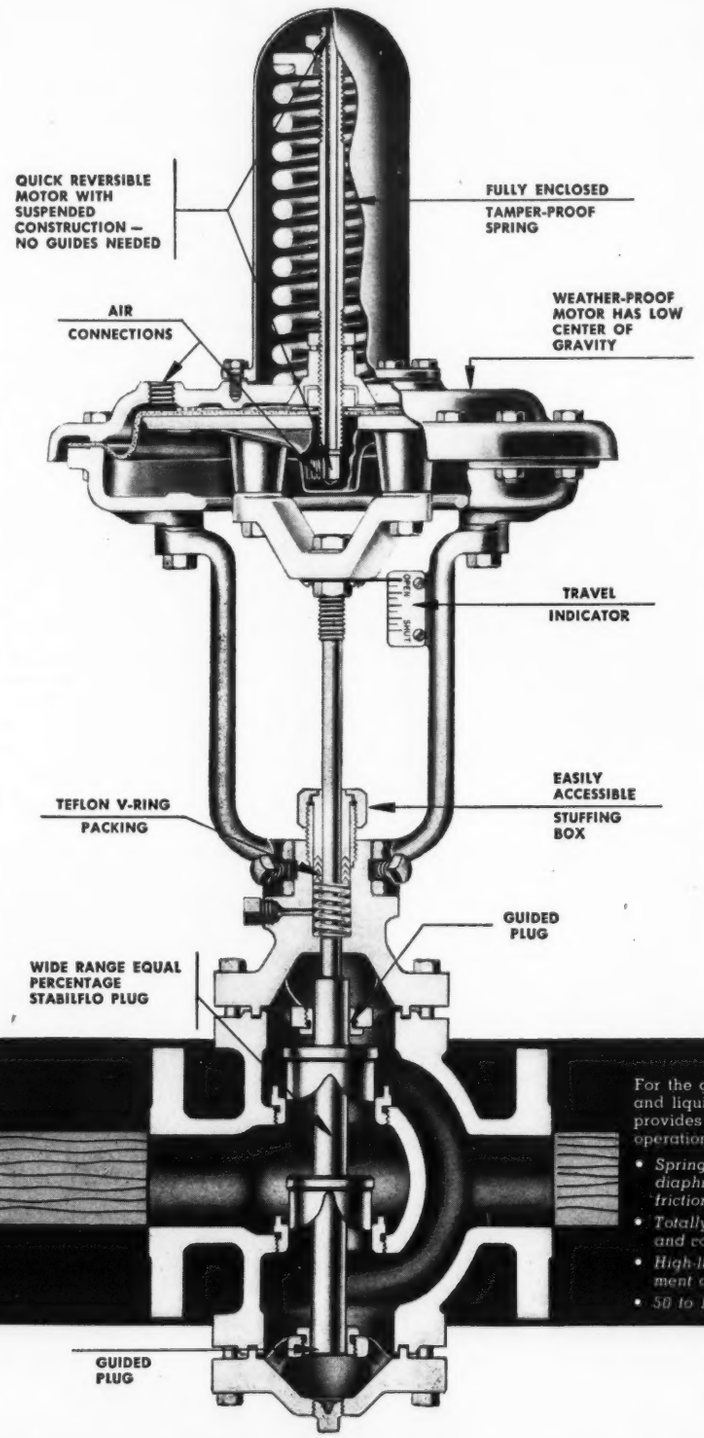
SOLUTION TO YOUR CONTROL VALVE PROBLEMS

...with Foxboro Pneumatic Control Valves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FULLY ENCLOSED TAMPER-PROOF SPRING
WEATHER-PROOF MOTOR HAS LOW CENTER OF GRAVITY
AIR CONNECTIONS
TRAVEL INDICATOR
EASILY ACCESSIBLE STUFFING BOX
TEFLON V-RING PACKING
GUIDED PLUG
WIDE RANGE EQUAL PERCENTAGE STABILFLO PLUG
GUIDED PLUG

You can always be sure of getting the control valve best suited to flow conditions and control actions when you specify Foxboro. No other single source offers such a wide variety of control valves for specific applications. None other has Foxboro's experience in applying them — in every phase of industrial processing.

Your choice extends from valves for simple on-off control at one extreme, to specialized proportioning control at the other; for high vacuum work to operation at 30,000 psi; for temperatures from −350° to +1000°F. And there's a wide choice of plug designs — and of alloys and trim to handle even severely corrosive and erosive fluids.

You can save shipping cost and time, too, buying direct from Foxboro's strategically located branch shops. They're staffed by experts.

A few typical control valves from Foxboro's complete line are illustrated here. For full details, or specific information on your problem, call your nearby Foxboro Field Engineer or write The Foxboro Company, 812 Neponset Ave., Foxboro, Mass.

STABILFLO CONTROL VALVES

For the great majority of temperature, pressure, flow, and liquid level control applications, this basic valve provides unsurpassed sensitivity and troublefree operation. Unique design features:

- *Spring-above-diaphragm construction makes diaphragm motor self-aligning, virtually free from friction and hysteresis.*
- *Totally enclosed spring protects against tampering and corrosion.*
- *High-lift wide range V-port provides greater increment of lift for given change in air pressure.*
- *50 to 1 rangeability · equal percentage characteristics.*

control point. This time-proportioning action compensates for system capacity.

Contact rating at output is 6 amp, 115v AC; 3 amp, 230v AC. Sensitivity of the instrument is 75 microvolts for all scale spans. Instrument is approximately an eight-inch cube and weighs about seven pounds. Standardization is unnecessary because of a voltage regulator.

(Series 150 Amplitrols are products of Wheelco Instruments Div., Barber-Colman Co., Dept. CP, 1300 Rock St., Rockford, Ill. Check 1717 opposite last page.)

Measures power level during reactor startup

Log-count-rate meter for nuclear reactor startup is presented in illustrated circular. Adjustable pulse-height selector gives indications of 1 to 10,000 counts per second. Specifications and typical installation are offered.

Spec S901-4 is issued by Industrial Division, Minneapolis-Honeywell Regulator Co., Wayne and Windrim Aves., Philadelphia 44, Pa. When inquiring specify 1718 opposite last page.

General information on transducers

Theory of operation, application information, and electrical and physical specifications of line of proving-ring transducers are given in two-page bulletin. Units are useful for dynamic or static measurement and control involving force, stress, weight, torque.

Bul 140 is issued by Daytronic Corporation, Dept. CP, 216 S. Main St., Dayton 2, O. Specify 1719 opposite last page.

For more information on product at left, specify 1720 . . . see information request blank opposite last page.

IT PUMPS...

IT METERS...

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WITHOUT LEAKAGE OR

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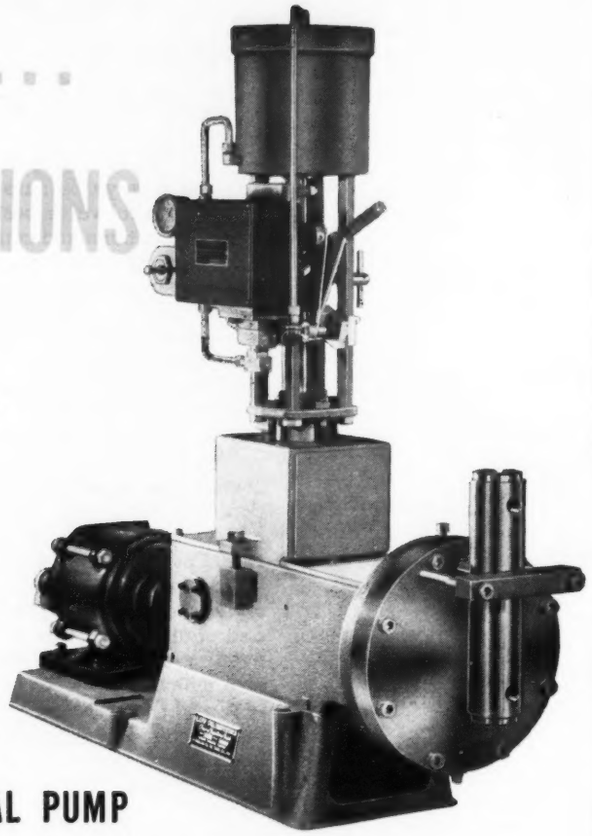


Lapp PULSAFEEDER

CONTROLLED-VOLUME CHEMICAL PUMP

If your process requirements demand accurate handling of corrosive and non-corrosive liquids, here is the pump for the job. The Lapp Pulsafeeder is a piston-diaphragm pump . . . it has positive displacement with *no stuffing box*. The product being pumped is isolated from the drive mechanism by a hydraulically balanced diaphragm, thus preventing leakage or contamination of the product. Pumping speed is constant; variable flow results from variation in piston-stroke length . . . controlled manually by hand-wheel, or, in Auto-Pneumatic models, by instrument air pressure responding to any instrument-measurable processing variable.

WRITE FOR BULLETIN 440 *with typical applications, flow charts, description and specification of models of various capacities and constructions. Inquiry Data Sheet included from which we can make specific engineering recommendation for your processing requirement. Write Lapp Insulator Co., Inc., Process Equipment Division, 668 Wilson Street, Le Roy, N. Y.*

Lapp

When inquiring check 1721 opposite last page

Controller starts cycle by changing process variable. Difference between actual and predicted process output . . .

MAINTAINS OPTIMUM PERFO

Uses: As simplified computer controller to automatically maintain desired process control and optimum process output despite continual changes in external process conditions. Instrument can be readily adapted to intermittent processes and non-linear measuring elements.

Some possible uses can be: maximizing output from a catalytic reaction, balancing steam usage of process against cost of product lost in bottoms, maximizing temperature in a boiler by controlling fuel-air ratio.

Features: Optimal controller operates without any knowledge of relationship between variable used as control and controlled variable. It is not necessary that this relationship be linear or stable.

Description: Combining some of logic devices of analog computers with conventional instrumentation, controller will handle many of the unpredictable factors that influence the process stream. Instrument functions by using slope of process operating curve as point of control. Effect of control variables can be maximized, or minimized, or even used to maintain a system at a previously

Process controller uses operating curve of process as point-of-control. Slope control is adjustable for the most, the least, or optimum

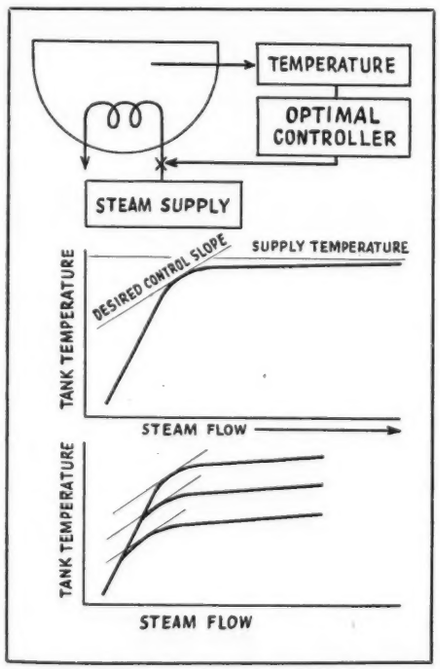
IMUM PERFORMANCE

. . . despite continual changes in external process conditions

selected point-of-balance. Since slope can have dimensions, by suitable choice of coordinates — as pounds of steam per pound of product, controller can be set to operate process at optimum economic balance.

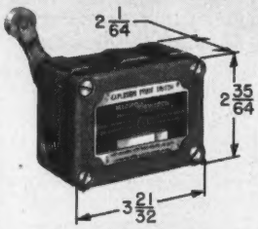
Simple application of optimal control is process tank heated by steam line where steam temperature is neither constant nor consistent. Wide range of ambient temperatures will occur around the tank. Also, gradual build-up of deposits will occur in the tank. As steam flow is increased, tank temperature will rise rapidly at first, then approach steam temperature gradually. Problem is to obtain most efficient use of steam. As indicated by the chart, best and most economic balance will probably fall somewhere on knee of the curve.

(*Please turn to next page*)



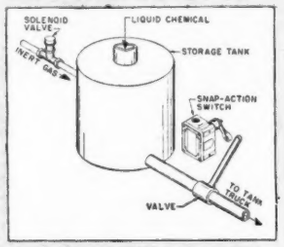
Typical application of optimal controller. Operational point is held on knee of curve regardless of changes in steam input

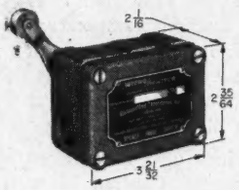
MICRO SWITCH . . . FIRST IN PRECISION SWITCHING



Explosion-proof switch makes unloading safer

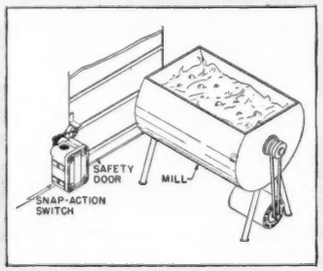
This MICRO SWITCH explosion-proof switch is used to minimize the danger involved in loading volatile chemicals into tank trucks. To prevent reaction (and possible explosion) of the chemical and air, inert gas must be released into the storage tank as chemicals are pumped out. The explosion-proof switch is so located that it is actuated when the valve is turned on to start the flow of chemical. The switch then automatically energizes a solenoid valve which releases the inert gas into the tank.





Splash-proof switch stops mixer if door is opened

This MICRO SWITCH splash-proof switch is located on a safety door to protect operating personnel from the splash of liquid chemicals. The chemical mixing mill is located in an isolated room. The splash-proof switch is mounted on the safety door and interlocked with the motor which runs the mixing mill. Opening the door stops the mixer and it cannot be started again until the door is closed.



How food and chemical processing plant operators use MICRO SWITCH Precision Switches to speed production with safety

MICRO SWITCH precision switches are everyday keys to automatic operation of food and chemical processing plants.

Especially useful are MICRO SWITCH explosion-proof switches for use in hazardous locations and splash-proof switches for use in moist and humid atmospheres.

Both switches are of heavy duty design for use as limits, safeties, interlocks, controls and indicating switches on a wide variety of equipment. Here are two applications which are typical of the use to which these switches have been put by plant operators.

Send for MICRO SWITCH Catalog No. 83

MICRO SWITCH distributors with full stocks of switches for every plant use requirement, are located near you.
Look under "Switches, Electric" in the Yellow Pages

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A DIVISION OF MINNEAPOLIS-HONEYWELL REGULATOR COMPANY
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When inquiring check 1722 opposite last page

detect O_2 in feed water

Continuous records of the oxygen dissolved in boiler feed water and of the hydrogen entrained in steam, indicate when corrective measures are necessary to prevent otherwise unsuspected and costly corrosion. Cambridge Analyzers measure and record dissolved oxygen directly. The hydrogen in the steam is measured and indicates the quantity of oxygen set free by dissociation. Cambridge instruments are available for continuously recording either O_2 or H_2 separately, or O_2 and H_2 simultaneously.

Send for Bulletin 148 B. P.

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3512 Grand Central Terminal • New York 17, N. Y.

PIONEER MANUFACTURERS OF PRECISION INSTRUMENTS

When inquiring check 1723 opposite last page

Here's Jerguson's

New! RED FLASHER TRUSCALE

Remote Reading Liquid Level Gage

Jerguson Red Flasher Truscales have illuminated scale which starts flashing red if boiler water gets too high or too low. Red warning flashes continuously until the dangerous condition is corrected.

Truscales give remote reading of boiler or tank liquid level accurately to ½ of 1% of scale reading. Scale on convex face; 180° visibility; easy to read from any point from which face can be seen.

Flashing Red Scale Warns of Danger

Protect valuable equipment with Jerguson Truscale Remote Reading Gages. Send for new 8-page bulletin which gives complete details.

JERGUSON

Gages and Valves for the Observation of Liquids and Levels

JERGUSON GAGE & VALVE COMPANY
100 Fellsway, Somerville 45, Mass.

Offices in Major Cities. In Canada: Peacock Bros. Ltd. In England: Bailey Meters & Controls Ltd. In France: Controle Bailey

When inquiring check 1724 opposite last page

Optimal Controller

(*Continued from preceding page*)

Actually, there is a large family of curves resulting from various combinations of steam temperature, ambient temperature, and tank deposits. Value of optimal controller is its ability to follow these changes in operating variables and maintain operation on the desired slope.

Concept of rate-of-change of an uncontrolled variable as basis for control allows operation without necessity of knowing relationship between variables. Basically, action of optimal controller is to make a change in process variable. Prediction is then made of what system output should be as result of change. Difference between actual and predicted process output is used for further change in process variable . . . until successive increments of difference become negligible.

Instrument is designed as general purpose unit suitable for plant use and yet with adaptability required for experimental work. Input voltage conditions for both span and suppression are set up on dial controls. Brown "continuous balance" servo system is coupling unit between transducer voltage outputs and computer control. Input voltage is adjustable over span of one to fifty millivolts with adjustable suppression to minus fifty millivolts. Process stabilization time can be ½ to 30 minutes or 5 minutes to 5 hours.

Computer controller operates on 115v AC. It is not affected by changes in ambient temperature over range from 0 to 170°F. Internal servos and value-difference predictor have repeatable accuracies of better than 1/3%. An external relay is supplied for self-monitoring alarm circuit.

(Optimal controller is product of Quarie Controllers, Dept. CP, P.O. Box 95, Canton, Mass. . . . or for more information reader may simply check 1725 on form opposite last page.)

Package digital converter fits within case of indicator . . .

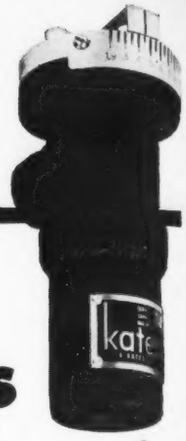
converts M-H series 156 circular scale indicator into single channel data system

Uses: As conversion system wherever a digital record of series of measurements is desired in addition to normal visual dial indication. Input can be from flowmeters, strain gages, or any other sensing element which will activate a Minneapolis-Honeywell series 156 circular scale indicator.

Features: Instrument converts indicator into single channel data system. All conversion equipment is contained within housing of indicator.

Description: System consists of analog-to-digital converter with associated gearing, mounting brack-

Are you sure you need a flow control system?

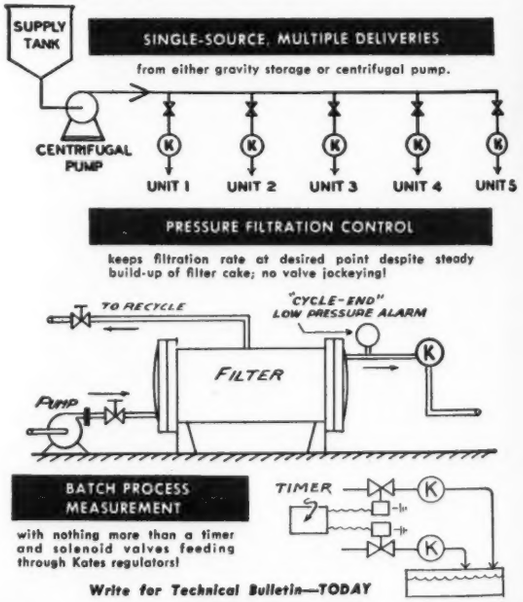


Better Check

Kates
SINGLE-UNIT
FLOW RATE REGULATORS

Here's an answer to liquid flow rate control that should appeal to processing, maintenance and accounting men alike. Inlet and outlet piping are the *only* connections; no linkages, control air or electronics are required. Just connect the flow piping and set the desired flow rate; nothing else is required. When inspection or maintenance are necessary, just lift the working parts from the case, which remains in the piping.

KATES direct-acting regulators combine with inexpensive centrifugal pumps or gravity feeds for precision control of blending, liquid circuits, process additives, or coolants—more reliably and at less cost than comparable control systems. Pressure jumps or drops of 125 psi, either upstream or down, are compensated internally —without hunting or lagging. Check over the following typical applications, then write for the entire story.



Write for Technical Bulletin—TODAY

Kates | **W. A. KATES COMPANY**
Department C
430 Waukegan Road
Deerfield, Illinois

When inquiring check 1726 opposite last page

IF YOU BUY OR SPECIFY CONTROLS

MERCOID® CATALOG No. 857

Will help make your selection easier

CONTENTS:

CONTROLS FOR PRESSURE—
DIFFERENTIAL PRESSURE—
TWO-STAGE PRESSURE—
TEMPERATURE—
TWO-STAGE TEMPERATURE
LIQUID LEVEL
FLOAT OPERATION
LEVER ARM OPERATION

WRITE FOR YOUR FREE COPY

ASK FOR CATALOG NO. 857

THE MERCOID CORPORATION
4201 Belmont Ave., Chicago 41, Ill.

When inquiring check 1727 opposite last page

FIRST WITH A COMPLETE LINE OF SAFETY SWITCHES

TO MEET THE New NEMA Standards

TYPES HD, ND, LD

at no cost premium

Write for New NEMA Standards Bulletin
Address Square D Company, 6060 Rivard St., Detroit 11, Mich.

NOW...EC&M PRODUCTS ARE A PART OF THE SQUARE D LINE

SQUARE D COMPANY

When inquiring check 1728 opposite last page

Digital converter fits within indicator case

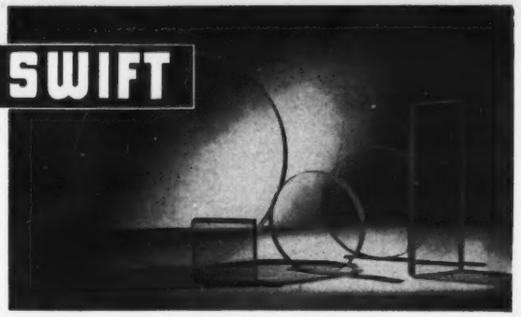
et, and cable connector. Indicator dial reading is converted to a decimal number in form of contact closures which are then used to operate mechanism of a card-punch or printer.

Maximum recommended digitalizing speed for long life is 300 digits/sec. Total scale travel of a 12 sec series 156 M-H indicator can be divided into 3600 digits if input data vary rapidly enough to utilize maximum dial speed. For inputs which vary more slowly, full scale travel can be divided into more digits, up to full range of converter (10,000 counts). Decimal digit output data are suitable for direct input into summary punch card system, electric typewriter, printer, and other devices. Power required is less than 200 watts at 110v AC.

(Digital converter is product of Hanson-Gorill-Brian, Inc., Dept. CP, 85 Hazel St., Glen Cove, N. Y. Check 1729 on form opposite last page.)

"Cosgrove's previous work experience helps immeasurably on this job."

Cartoon by Al Kapkowski, Bayway Refinery, Esso Standard Oil Company, Linden, N.J.



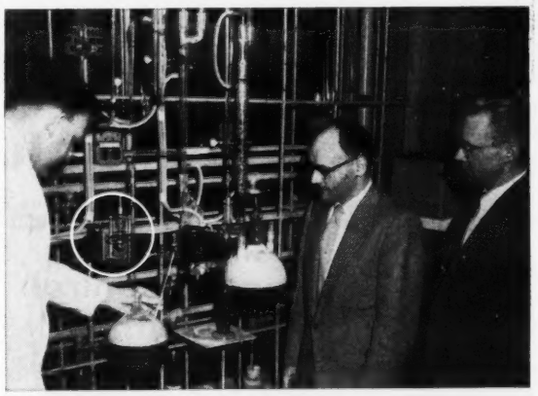
a fast, convenient source for PYREX SIGHT GLASSES

We can supply perfectly true circles, precision-ground from heat-resistant polished plate glass. Used by chemical companies from coast to coast —resist clouding, pitting, chemicals (except HF and strong hot caustic solutions).

Squares, rectangles or odd shapes in 8 thicknesses (⅛" to 1"), sizes up to 24" x 60", also available for immediate shipment. Write, wire or phone for bulletin or quotation.

SWIFT Glass Division
SWIFT LUBRICATOR COMPANY, INC.
2 Glass St., Elmira, N.Y.

When inquiring check 1730 opposite last page



CORSON-CERVENY MICRO BELLOWS PUMP Meters Sodium Chlorate in Improved Mathieson ClO_2 Process

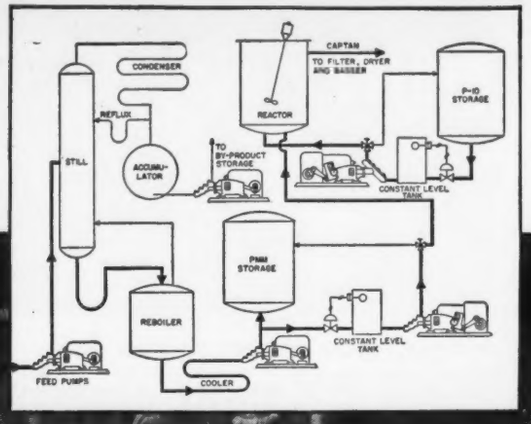
In the development of this process (which may effect a savings as high as $8000 a year per ton day of gas produced) the Corson-Cerveny Micro Bellows Pump was used to meter sodium chlorate into the laboratory scale generator.

This is but one of many diversified jobs the Micro-Bellows Pump does in research and development laboratories, especially where highly corrosive chemicals are pumped . . . because all parts of the pump in contact with the liquids are made of corrosion-resistant stainless steel.

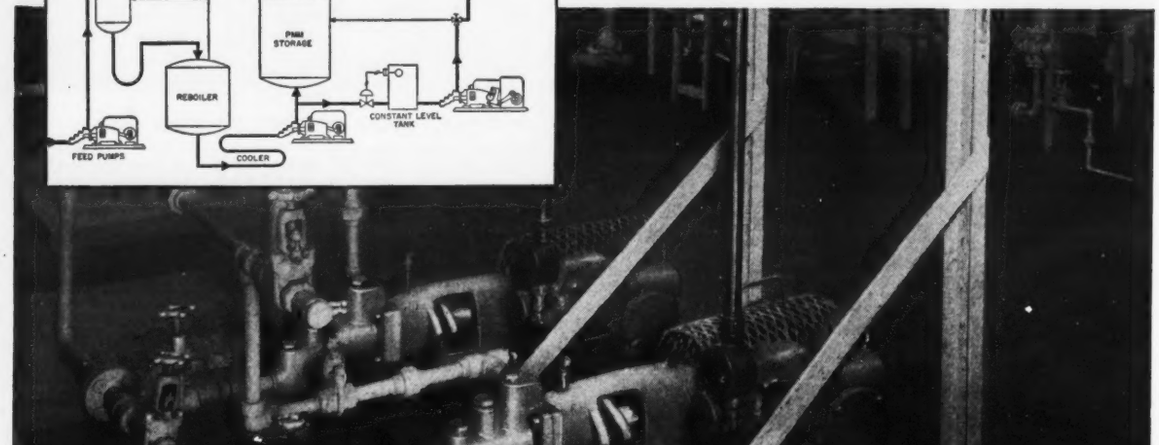
Write for complete information, and for bulletins on other types of specialized laboratory testing equipment.

RESEARCH APPLIANCE CO.
BOX 307, ALLISON PARK, PA.

When inquiring check 1731 opposite last page



In the production of Captan, an agricultural fungicide, Milton Roy pumps control feed rates in the separation of perchloromethylmercaptan by distillation at Calhio Chemicals, Inc., Perry, Ohio. The accurate delivery of these pumps also permits reacting of chemicals in stoichiometric amounts.



Controlled Volume Pumps hold critical material balances

Provide precise control of distillation columns

You can step up the efficiency of complex distillation processes with Milton Roy Controlled Volume Pumps. These pumps make possible extremely close control of chemical feed rates and rates at which distillates are withdrawn from the still. With precise control of feed and distillate rates comes the fine balance of chemical materials which is essential to ultimate product quality.

Accurate in delivery within ± 1%, Milton Roy Controlled Volume Pumps serve equally well as flow controllers, ratio controllers, or final control elements. They're available in simplex, duplex, and multiple liquid end types. Capacities from 3 milliliters per hour to 45 gpm. Pressures to 50,000 psi.

Why not investigate these pumps for chemical metering in your own plant? Upgraded product quality, reduced chemical costs, savings in operating and maintenance expense are certain results. Milton Roy Company, Manufacturing Engineers, 1300 East Mermaid Lane, Philadelphia 18, Pa.

Write today for application data on Controlled Volume Pumps in Process Instrumentation (Bulletin 1253).

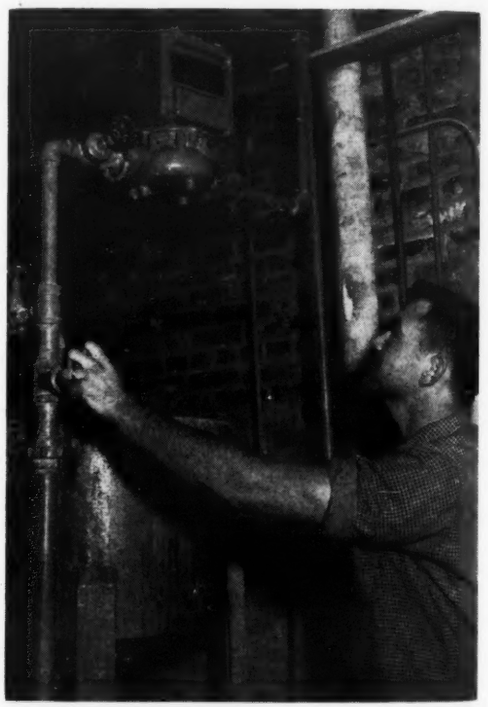
milton Roy
CONTROLLED VOLUME PUMPS

Engineering representatives in the United States, Canada, Mexico, Europe, Asia, South America and Africa.

When inquiring check 1732 opposite last page

10% water error spoiled glue —
too much: it was weak,
too little: it set . . .

box plant lost $100 worth now flow integrator



Operator adds water according to number of gallons. Using water meter instead of "sticking" the tank saves cost of instrument in first year

Problem: Like about two thirds of the box plants in the US Downey Box Div., of Central Fibre Products Co., in North Kansas City, Mo., uses starch base adhesive. Water, starch, and other ingredients of this adhesive are mixed and cooked in a large welded, square tank.

In producing this adhesive, an operator dumped contents of twelve 100 lb bags of starch into the tank. Correct amount of water was gaged by filling the tank to a mark. In the main this scheme worked well enough — error in water quantity had to be about 10% before the formulation was too far out of line. But occasionally too much water was added making the paste too thin and weak . . . or, worse, too little water was added and

...of starch about twice a year; prevents this waste

the stiff adhesive formed had to be dumped to prevent it from setting up in the tank and lines. This meant an average starch waste cost of about $100 every six months.

Solution: In May, 1954, Downey installed a flow integrator to make batching of starch adhesives more exact. This instrument is a nutating-disc meter for a one-inch line. It reads directly in gallons to 9999.9 in a digital register. Flow rates through this instrument should fall in the range 5-50 gpm for cold water to 5-30 gpm for hot (250°F) water. Filling this 550 gallon tank takes about 22 minutes — at a rate of 25 gpm.

When water in tank reaches correct total, operator cuts it off by means of a quick-opening hand valve. Register of flow integrator can then be reset to zero for easy reading in next batching operation. A second totalizing register of the integrator does not reset but shows cumulative total as a check on number of batches run and so forth.

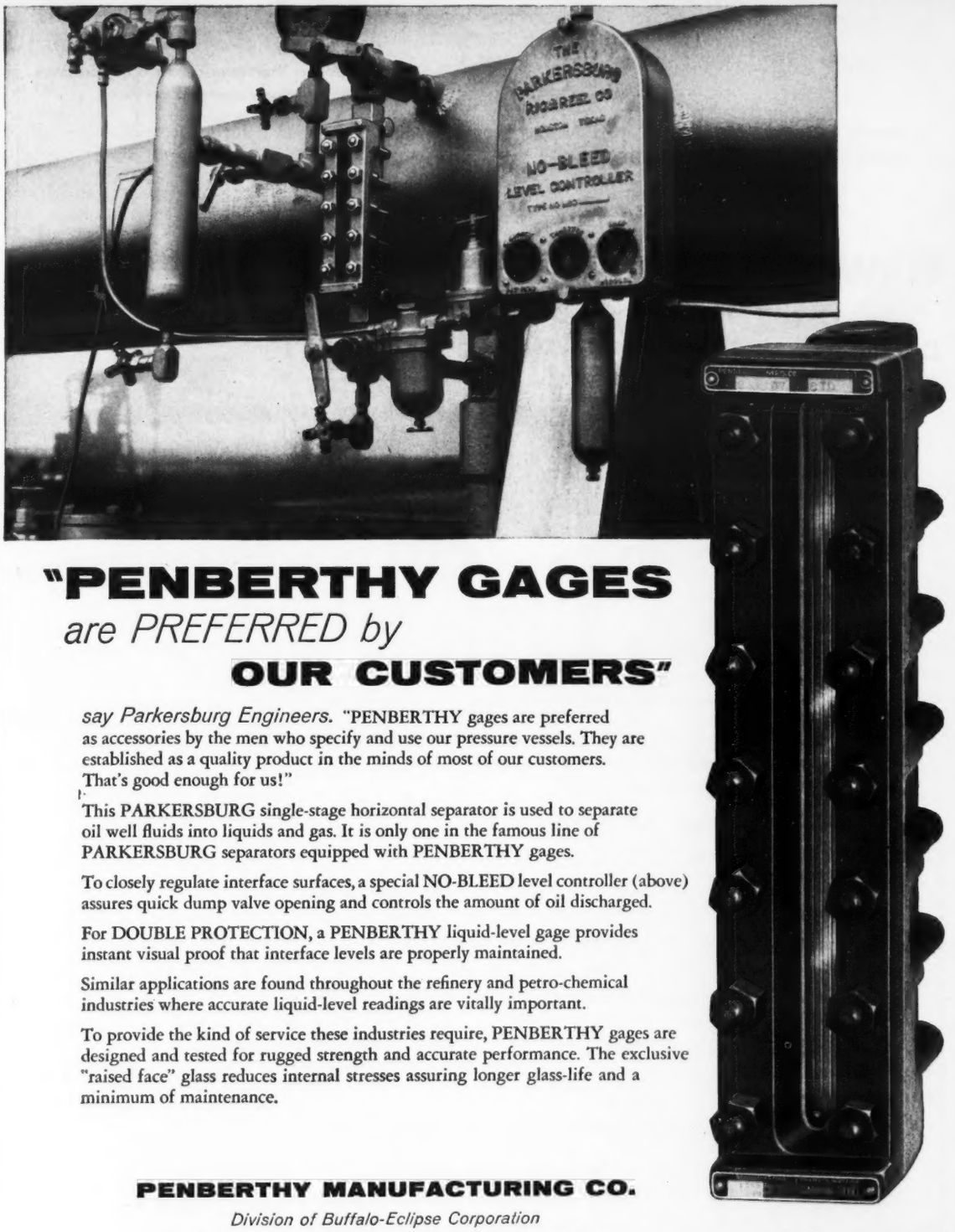
Results: Since installation of the meter more than two years ago not a single batch has been lost. And savings effected by this batching scheme paid for the instrument during the first year based on average loss of starch prior to its installation.

(Type S meter used in this setup is a product of Neptune Meter Co., Dept. CP, 50 W. 50th Street, New York 20, New York . . . or for more information check 1733 on form opposite last page.)

Pneumatic controllers depicted in well-illustrated bulletin

More than 75 photographs and drawings are used in 56-page bulletin that describes high sensitivity, wide control-band controllers for temperature, pressure, flow, vacuum, etc. Control principles are discussed, and the various control methods available are shown. Reset rates form 0.1 to 10, or 1 to 300, and derivative times of 0.2 to 20 minutes are possible with equipment described.

Bul A130 is issued by The Bristol Company, Dept. CP, Waterbury 20, Conn. When inquiring specify 1734 on form opposite last page.



"PENBERTHY GAGES *are PREFERRED by* **OUR CUSTOMERS"**

say Parkersburg Engineers. "PENBERTHY gages are preferred as accessories by the men who specify and use our pressure vessels. They are established as a quality product in the minds of most of our customers. That's good enough for us!"

This PARKERSBURG single-stage horizontal separator is used to separate oil well fluids into liquids and gas. It is only one in the famous line of PARKERSBURG separators equipped with PENBERTHY gages.

To closely regulate interface surfaces, a special NO-BLEED level controller (above) assures quick dump valve opening and controls the amount of oil discharged.

For DOUBLE PROTECTION, a PENBERTHY liquid-level gage provides instant visual proof that interface levels are properly maintained.

Similar applications are found throughout the refinery and petro-chemical industries where accurate liquid-level readings are vitally important.

To provide the kind of service these industries require, PENBERTHY gages are designed and tested for rugged strength and accurate performance. The exclusive "raised face" glass reduces internal stresses assuring longer glass-life and a minimum of maintenance.

PENBERTHY MANUFACTURING CO.
Division of Buffalo-Eclipse Corporation
1242 Holden Avenue **Detroit 2, Michigan**

***There's Certain Satisfaction in* PRODUCTS BY PENBERTHY**

- EJECTORS
- INJECTORS
- CYCLING JET PUMPS
- ELECTRIC SUMP PUMPS
- LIQUID LEVEL GAGES
- GAGE VALVES

When inquiring check 1735 opposite last page

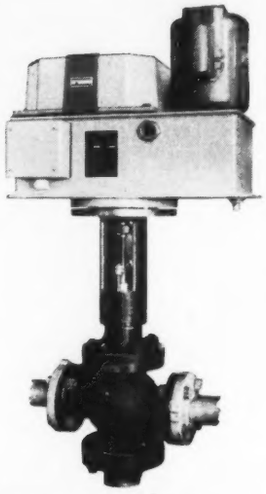
Askania Regulator Company NEWS

Automatic Controls for
PRESSURE, FLOW and COMBUSTION

USEFUL NEW BULLETIN

•

Describes and illustrates
UNIQUE
Final Control Element



The new Askania Electro-Hydraulic Valve Actuator which makes possible electric operation of the final control element.

Here's a well illustrated informative bulletin with ample facts, photos and drawings to show you the advantages of an all electric control system using this unique valve actuator.

Bulletin #38.2 contains the type of information you'll want at your fingertips—such as:

Valve Stem Speed • Valve Stem Thrust • Input Coil Resistance • Power Supply Requirements • Frequency Response • Weight • Oil Capacity •

Facts you'll want to know

Bulletin #38.2 explains that the ASKANIA *Electro-Hydraulic Valve Actuator can be:*

1 Adapted to any electronic controller with d-c signal output

2 Applied to any valve up to 8 inches in size and with strokes ranging from ½ inch to 2 inches

3 Adjusted to provide the proper setting for the desired valve stroke

4 Supplied with or without the valve

Be Informed—

Write for your copy of Askania Application Bulletin No. 38.2 Regardless of your present needs, you'll want to know about this novel FINAL CONTROL element. Just write Askania Regulator Company, 242 E. Ontario, Chicago 11, Ill.

ASKANIA REGULATOR COMPANY
"CONTRÔLS FOR INDUSTRY"
HYDRAULIC, ELECTRONIC CONTROLS & SERVOS, GENERAL SYSTEMS, ENGINEERING & COMPUTER SERVICE, VALVE ACTUATORS & CYLINDERS

A SUBSIDIARY OF GPE

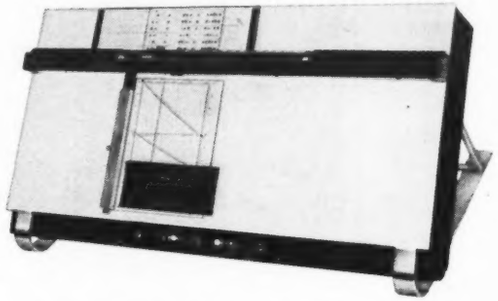
When inquiring check 1736 opposite last page

Performs harmonic analysis on recorded curves . . .

highly reproducible results can be obtained by relatively inexperienced users

Uses: As analog computer in fitting power series equations to curves or test points for use in automatic digital computers, thus eliminating analog to digital converters.

Features: Analysis made by computer is in a form suitable for quick differentiation, integration,



Analog computer reduces time required to convert raw data into usable form. Unit is electrically driven

and area moment calculations by ordinary calculus methods. Fourier coefficients can be determined for 48 constants, power series coefficients up to eighth power.

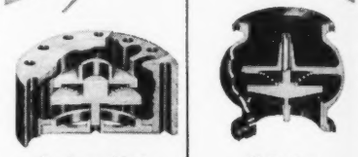
Description: Electrically-driven analog computer performs harmonic analysis and curve fitting on plotted or recorded curves. Highly reproducible results can be obtained quickly by relatively inexperienced operators without extensive mathematical background. Instrument will analyze a curve in terms of a Fourier series, a power series, or a least squares fit (orthogonal polynomial). It will also produce a slope equation or an integral equation of the curve. Resulting equations are obtained directly from machine readings recorded on specially designed program sheet.

When equipped with the instrument, an engineering aid is said to be equivalent to an engineer for reducing data. Instrument consequently accomplishes better utilization of engineering personnel.

Analog computer is completely self-contained and operates from 110v AC source. Work surface is illuminated from beneath. Operation requires only that readings be made with instrument on program sheet. Summation of readings and simple arithmetic multiplication produces required equation.

(Equameter is product of The Gerber Scientific Instrument Company, Dept. CP, 162 State St., Hartford 3, Conn . . . . for more information check 1737 on form opposite last page.)

THESE VALVES
control
surge pressures
silently



Center-guided type for lines from 1" to 10".

Globe-type for lines from 3" to 24".

WILLIAMS·HAGER
FLANGED
Silent
CHECK VALVES

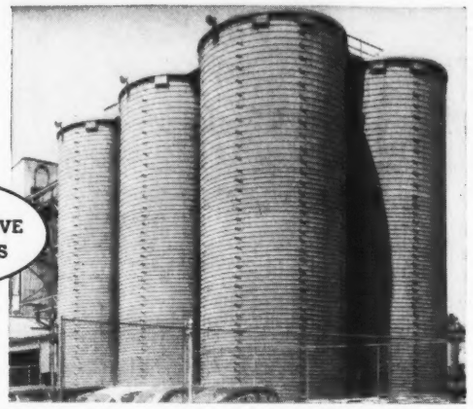
Surge pressures . . . and the resulting water hammer . . . are effectively controlled by these valves. Protection for pumps and piping systems is assured—a fact testified to by satisfactory service in every type of industry over a period of 28 years, in pressures up to 5,000 pounds.

Write for Bulletins:
No. 654 on the Valves
No. B51 on Cause, Effect and Control of Water Hammer

THE WILLIAMS GAUGE CO., INC.
146 Stanwix Street
2 Gateway Center Pittsburgh 22, Pa.
Our 71st Year • 1886-1957

When inquiring check 1738 opposite last page

There's a heavy conveying system atop these Neff and Fry Bins



A continuous reinforced concrete roof on the six 20' x 52½' bins carries a big screw conveyor with piers, chutes, etc. Observe that there are no additional supports from the ground. The bins themselves support the entire load.

This strikingly proves the load-bearing strength of Neff & Fry Bins. Of course, the bins also have the lateral strength to contain 4,000 tons of grain.

The walls of Neff & Fry Bins are constructed of Super-Concrete Staves. For a complete understanding, read our folder, "Bins With the Strength of Pillars." Ask for it now before you forget.

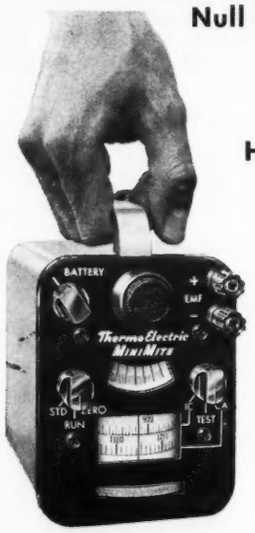
NOT EXPORTED
EXCEPT TO CANADA AND MEXICO

THE NEFF & FRY CO.
166 ELM ST. • CAMDEN, OHIO

When inquiring check 1739 opposite last page

NEW, Pyrometer Indicator

Null Balance, Potentiometer Type



MINIMITE

Has 23½ Inch Double Scale

Small Size Extremely small and compact, this null balance Portable Potentiometer Indicator weighs under four lbs. and measures only 4" x 5" x 6".

Scale Range Despite its small size the "MiniMite" has a 23½ inch double range scale. There are 15 available scales for all standard thermocouple materials. These scales include temperature ranges from —300°F. to +3200°F. and millivolt ranges from 0 to 62. Measuring accuracy is ¼ of 1% of scale range.

Dual Application The "MiniMite" can measure temperature directly when connected to a thermocouple, or check other potentiometer or millivoltmeter-type instruments when used as a calibrating instrument.

Write for Bulletin 64-R.

ThermoElectric Co. Inc.
SADDLE BROOK, NEW JERSEY
In Canada—THERMO ELECTRIC (Canada) Ltd., Brampton, Ont.

When inquiring check 1740 opposite last page

Will turn off process when time interval is completed . . .

standard models handle up to 10 circuits and 1 hr range

Uses: As multiple circuit, single interval timer where process is to be turned on manually and stopped automatically. Can be used to control pilot units and processes or other operations where adjustable time limit is necessary.

Features: Standard models of interval timer are available with one to ten circuits.

Timer is set by turning pointer against stop member

Description: Timer dial includes stop member for use when time setting is used repeatedly. Timer is set by turning pointer against stop member. Synchronous motor moves pointer toward "zero" showing amount of time left in cycle.

Contacts are rated 15 amp at 115v AC. Contact closure intervals are adjustable from 0% to 50% of time cycle. Dial is 3½" square. When using two switches, timer is 3-15/16" deep.

(Model 73 Interval Timer is product of Hagen Manufacturing Company, Inc., Dept. CP, Moline, Ill. Check 1741 opp. last page.)

This month's Processing & Engineering Data section begins on page 208

So SIMPLE We Can Adapt It to ANY LIQUID LEVEL CONTROL JOB

A sleeve, raised and lowered within a non-magnetic tube, attracts or releases an Alnico magnet attached to a mercury switch. Basically, this is Magnetrol.

MAGNETROL

AS DEPENDABLE AS MAGNETIC FORCE ITSELF

● No matter how specialized the liquid level control application, adapting Magnetrol to meet it presents no problem. Whether it's for high pressures, high temperatures, corrosive liquids or any other condition, a few "standard" modifications and the job is done! Operation is so simple no changes in basic design are needed. That's why Magnetrol "fits" practically any application — why "specials" are so often standard with us.

Because of the utter simplicity and dependability of its magnetic principle, Magnetrol has *infinite operating life.* There are no wearing parts to get out of order.

Magnetrols are available for controlling level changes from .0025-in. to 150-ft., with single or multi-stage switching. Our experienced engineering staff is at your service.

MAGNETROL, Inc.

WHY NOT MAIL THE COUPON—NOW

MAGNETROL, Inc., 2129 S. Marshall Blvd., Chicago 23, Illinois
Please send me catalog data and full information on Magnetrol Liquid Level Controls.
Name_____
Company_____
Address_____
City_____ Zone____ State____

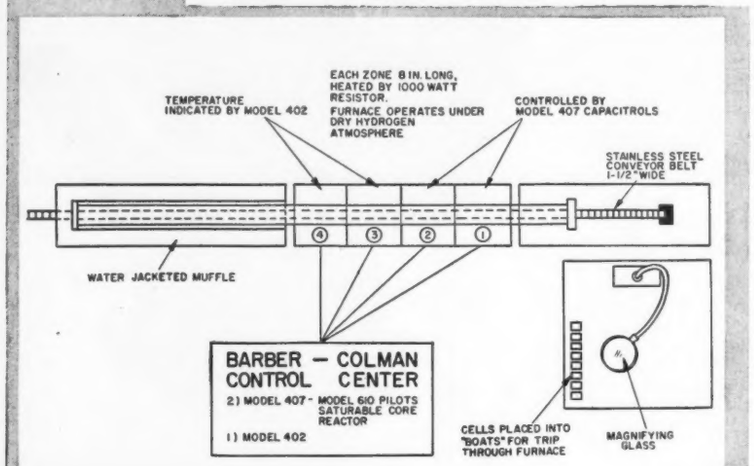
When inquiring check 1742 opposite last page

THE MARK OF QUALITY

BARBER COLMAN

Wheelco Instruments

How Capacitrols solved critical temperature control problem in transistor manufacture at RCA


EACH ZONE 8 IN. LONG, HEATED BY 1000 WATT RESISTOR.
FURNACE OPERATES UNDER DRY HYDROGEN ATMOSPHERE
TEMPERATURE INDICATED BY MODEL 402
CONTROLLED BY MODEL 407 CAPACITROLS
STAINLESS STEEL CONVEYOR BELT 1-1/2" WIDE
WATER JACKETED MUFFLE
BARBER — COLMAN CONTROL CENTER
2) MODEL 407 - MODEL 610 PILOTS SATURABLE CORE REACTOR
1) MODEL 402
CELLS PLACED INTO "BOATS" FOR TRIP THROUGH FURNACE
MAGNIFYING GLASS

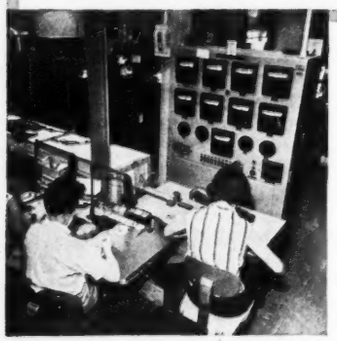


Diagram above shows smaller of two furnaces producing transistor cells. Two minute balls of indium are alloyed onto opposite sides of a .002 in. thick slice of germanium. Zones of germanium-indium alloy must grow inward toward central plane of germanium wafer to within .001 in. of each other. Conveyor belt carries cells through four furnace zones heated by resistors rated at 1000 watts per zone. Two Model 407 Capacitrols control temperature of zones 1 and 2. One Model 402 Capacitrol indicates temperatures in zones 3 and 4 by switching.

Photo at left shows workers preparing cells before Wheelco Control Center of larger, 12-zone furnace on which Model 407 Capacitrols similarly control and indicate temperature. Controlled temperatures are 610 to 550 C.

By applying accurate Wheelco 400 Series Capacitrols to two furnaces, RCA solved the key problem of process temperature control during crystal growth in its Harrison, New Jersey, transistor plant. The 400 Series Capacitrols are completely self-contained, direct-deflection-type indicating controllers with a wide range of application to jobs where temperature control is critical. 400 Series Capacitrols operate on the proved and accepted Wheelco "electronic control principle"—a precise control circuit constantly sensing changes in the measured variable. Simple design, careful workmanship, and quality materials insure long, trouble-free service. Write today for details of RCA's challenging problem and the simple solution found in Wheelco's 400 Series Capacitrols.

BARBER-COLMAN COMPANY

DEPT. N, 1520 ROCK STREET, ROCKFORD, ILLINOIS

BARBER-COLMAN of CANADA, Ltd., Dept. N, Toronto and Montreal, Canada

Industrial Instruments • Automatic Controls • Air Distribution Products
Aircraft Controls • Small Motors • Overdoors and Operators • Molded Products • Metal Cutting Tools • Machine Tools • Textile Machinery

When inquiring check 1743 opposite last page

INSTRUMENTATION

Allows many combinations for both control and alarm

Uses: As temperature controller for off-on control of heating operations, processes, equipment, including safety alarms, cut-outs, and combinations of both control and alarm.

Features: Differential expansion temperature controllers are available with one, two, or three snap-action switches. Instrument allows combined control-alarm installations or unusual uses.

Description: Temperature controller operates by difference in expansion of two concentric tubes when exposed to heat. Resulting movement is multiplied through a lever arrangement which actuates one or more switches.

Standard switch rating is 15 amp, 125-250v AC. Higher ratings are available.

Cases are water-tight and can be used in outdoor locations. Controllers cover range from subzero to 2000°F. One instrument has an adjustable range of 1200°F.

(Models F-1C, F-2C, and F-3C temperature controllers are product of Burling Instrument Company, Dept. CP, 16 River Road, Chatham, New Jersey. Check 1744 on form opposite last page.)

Suggests applications for thermocouples

Illustrated six-page, two-color folder describes application of miniature gasket thermocouples to skin-temperature measuring.

"Gasket Thermocouples—Type 1" is issued by Thermo Electric Co., Inc., Dept. CP, Rochelle Park Post Office, Saddle Brook, N.J. Specify 1745 opposite last page.

MARSH Mastergauge

Always the best of the better gauges, Mastergauge has been given *plus* features that further lengthen its lead.

A still better tube construction: Socket, tube and end piece are now all fused into *one* leak-tight unit by the new Marsh "Conoweld" process.

A still better case: New copper clad wrought steel "Marshalloy" case has the corrosion resistance of pure copper; weighs one third as much as cast iron, and is *four times* as strong.

An even finer movement: Further refinements are added to the rugged, corrosion resistant, virtually frictionless stainless steel and monel Mastergauge movement. A typical refinement is the "coined" (extruded) sector gear which contributes extra strength and precision.

Where only the best is good enough—in the most critical industrial refinery and oil country services —"Mastergauge" is your instrument.

The JAS P MARSH Corporation 90th

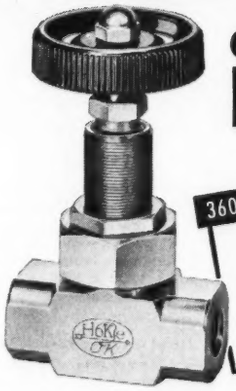
WRITE FOR NEW CATALOG

MARSH INSTRUMENT CO. Sales affiliate of Jas. P. Marsh Corporation
Dept. Z, Skokie, Ill.
Houston Branch Plant: 1121 Rothwell St., Sect. 15, Houston, Texas
Marsh Instrument & Valve Co. (Canada) Ltd., 8407 103rd St., Edmonton, Alta.

When inquiring check 1746 opposite last page

HOKE announces

10 valves in 1



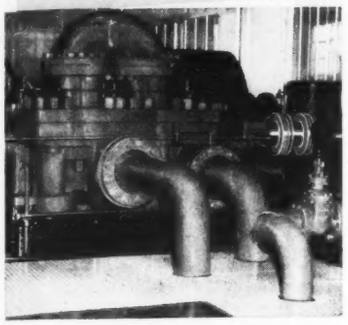
For conditions ranging from 3000 psi to low vacuums, or distilled water to corrosive fluids. Series consists of four basic stainless steel bar stock valves...O-ring or Teflon packing with flat Teflon disc or vee point non-rotating, replaceable stem plug...plus six body styles. All parts interchangeable as well as replaceable. Choice of ¼", ⅜" or ½" pipe sizes or Swagelock tube fittings. Panel mounting, too. **Get the facts about this "10 in 1" valve. Write us today.**

HOKE

HOKE INCORPORATED
Fluid Control Specialists
145 S. Dean Street
Englewood, N.J.

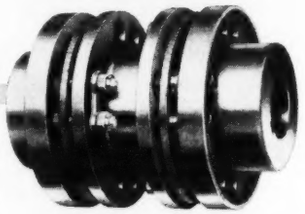
When inquiring check 1747 opposite last page

THOMAS
FLEXIBLE COUPLINGS PROTECT Your Pumps



Pump troubles such as replacement of packing glands and bearings are practically eliminated when Thomas Flexible Couplings are used.

There is a THOMAS Coupling for every purpose.



UNDER LOAD and MISALIGNMENT ONLY THOMAS FLEXIBLE COUPLINGS OFFER ALL THESE ADVANTAGES.

1. No Cross-pull on Bearings or Gland.
2. No End-thrust on Bearings or Impeller.
3. Freedom from Backlash — Torsional Rigidity.
4. Free End Float.
5. Smooth Continuous Drive with Constant Rotational Velocity.
6. Visual Inspection in Operation.
7. Original Balance for Life.
8. No Lubrication.
9. No Wearing Parts.
10. No Maintenance.

Write for Engineering Catalog 51-A

THOMAS FLEXIBLE COUPLING CO.

WARREN, PENNSYLVANIA, U. S. A.

When inquiring check 1748 opposite last page

Describes, pressure measurement with fluid pressure cells

Many industry applications of fluid pressure and load cells are covered in 20-page bulletin. Brief descriptions of load cell devices for tank, ore bucket, and railroad car weighing, and torque measurement are presented. Illustrations show various applications. Bulletin also describes fluid pressure cells for use where pressure measurements of gases or liquids are required.

Bul 4300 is issued by Baldwin-Lima-Hamilton Corp., Dept. CP, Philadelphia 42, Pa. When inquiring specify 1749 on form opp. last page.

Outlines facilities available for systems engineering

Including a description of "systems approach" to process control instrumentation, 16-page, three-color booklet outlines manufacturer's consulting service for systems engineering. Facilities available and methods in chemical analysis, process monitoring, process control, dynamic and static testing are discussed.

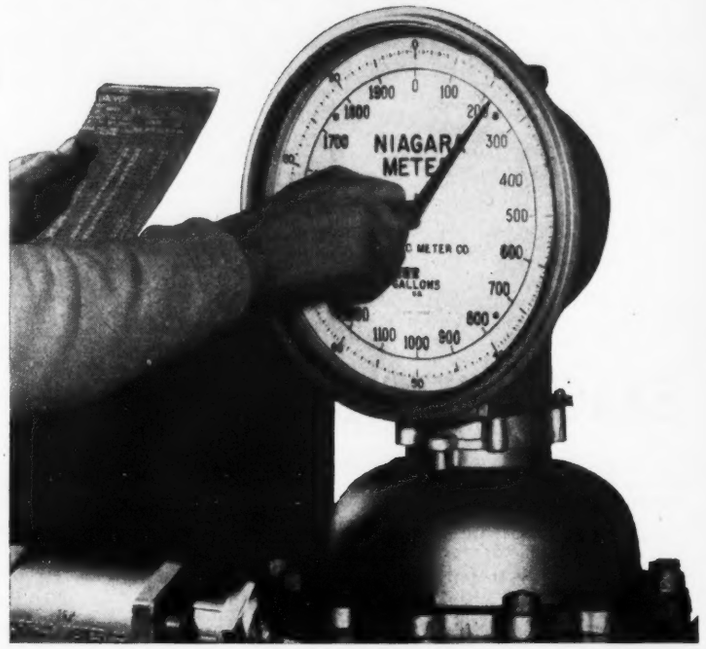
CEC 1304A is issued by Systems Division, Consolidated Electrodynamics Corp., Dept. CP, 300 N. Sierra Madre Vilia, Pasadena, Calif. When inquiring specify 1750 on form opp. last page.

High volume air sampler

. . . has been developed for sampling large volumes of air for particulate matter with filter paper. Sampler has been used to sample air containing particles one hundredth of a micron in diameter. Unit uses a turbine blower and is designed for 24-hr sampling. Housing is cast aluminum. Power required is 110v AC, 25-60 cy.

(High Volume Air Sampler is product of Air Sampler Div., The Staplex Company, Dept. CP, 777 Fifth Ave., Brooklyn 32, N. Y. Check 1751.)

You get EXACTLY what you set — No More — No Less!



When you use NIAGARA Displacement Meters for process control

Consistent accuracy in liquid measurements is obtained with Niagara Electricontact Meters. Set the gauge for the number of gallons required and accuracy goes into action. The set number of gallons will be exactly measured through the meter and the flow stopped by the closing of a solenoid valve.

Niagara Meters are of the accurate, positive displacement type. Each Niagara Meter is guaranteed to be individually tested and calibrated at the factory to run within close tolerances at all rates of flow within its rated capacity.

Learn all the facts . . . Mail the coupon for complete information.

BUFFALO METER CO.
2892 Main Street
BUFFALO 14, N. Y.

Please send me complete information on the use of Niagara Electricontact Meters for liquid formulations.

Liquid used.....
Flow G.P.M.....°F.....
Name.....
Company.....
Address.....

When inquiring check 1752 opposite last page

Check filled-bags faster with . . .

MODEL 1302-R

EXACT WEIGHT Scale

Right on your conveyor line, this EXACT WEIGHT Scale gives an accurate, split-second check of both open-end and valve-type bags. Because every bag is checked, costly over-weights can be completely eliminated. EXACT WEIGHT Scales weigh fast because of short lever fall and the action of an adjustable hydraulic damping device. They read fast, too, because of high-ratio visible indication. Model 1302-R can be installed on the floor or recessed into the floor, as shown. It is also available with round commodity platter instead of rollers, or with sack rest. Standard capacity is 100 lbs. — more if needed. Indicator travel of 2½" over-and-under is equivalent to 2 pounds over-and-under. Write for complete details on Model 1302-R.

Exact Weight Scales are trouble-free. Maintenance cost is at a minimum.

Sales and Service Coast to Coast

Exact Weight Scales

Better quality control
Better cost control

THE EXACT WEIGHT SCALE COMPANY

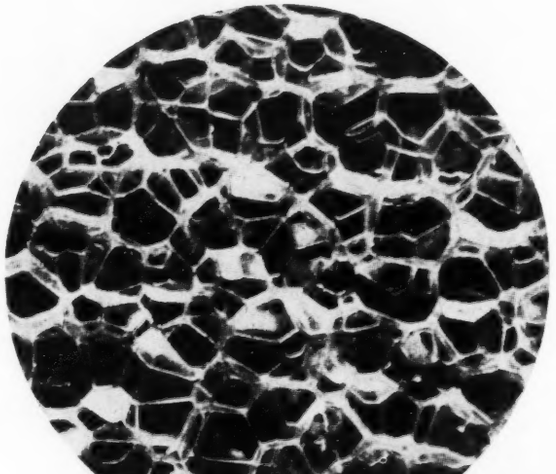
905 W. Fifth Avenue, Columbus 8, Ohio

In Canada: P. O. Box 179, Station S, Toronto 18, Ont.

When inquiring check 1753 opposite last page

Use of synthetic rubber hardboard for rail car insulation enables Olin Mathieson to . . .

cut solid-CO_2 shipping losses dr



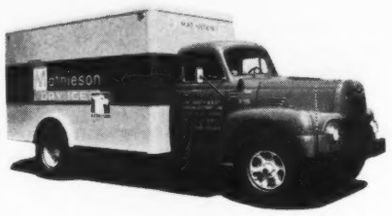
Insulating material is composed of millions of sealed, nitrogen-filled cells

Problem: Olin Mathieson Chemical Corporation operates the largest single dry ice manufacturing plant in the world at Saltville, Virginia, distributing to over 19 warehousing points over the country. Previously Mathieson's dry ice rail cars were insulated with natural insulation. These cars were of 1280 block capacity, about 75 thousand pounds.

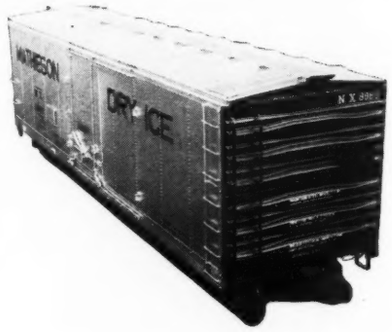
In the industry, it is the supplier who absorbs the evaporation losses en route until the dry ice is finally sold. This, from the supplier's profit stand-point, makes it imperative that his transport equipment be efficient. And in some cases the company's older equipment allowed loss of up to two percent of net load per day.

Because of the temperature of dry ice — minus 109.6°F — it is not possible to re-

Interior of rail car is fully lined with galvanized sheet steel with welded seams



sses drastically



frigerate the car to prevent loss of the commodity by sublimation. All that can be done is to minimize heat entry through insulated walls, roof, and flooring by design and use of highly efficient insulation.

Solution: To replace older equipment, Olin Mathieson has designed and had built for them larger cars of 1505 and 1806 block capacity (about 90 to 105 thousand pounds) and insulated with synthetic rubber hardboard insulation. Material is an expanded synthetic compound, composed of millions of nitrogen-filled cells which are permanently sealed and bonded together with hard rubber. Because of closed cellular structure, material cannot absorb water or moisture even at cut edges. Average compressive strength is 60 psi, yet it is light weight — 4.5 lb per cu ft. Material has low heat conductivity (K Factor 0.21) and will retain its maximum insulating efficiency indefinitely.

Cars use so-called "floating floor" structure, eliminating load members other than the insulation itself and providing minimum heat entry in cars. Inside dimensions on cars are 37'8" long by 6'2" wide by 6'2" high. Load of dry ice is 43 blocks long by 7 blocks wide by either 5 or 6 blocks high.

(Please turn to next page)

4 STAR SERVICE
makes Continental Steel Containers your best buy

ICC-APPROVED TIGHT-HEAD PAILS

Capacity 5 gallons. Made from heavy 24- or 26-gauge steel. Meets ICC specifications 17E and 37D. High-strength body available with straight sides or top and bottom beads. Drum top offset for easy stacking. Electric lap-weld side seam, and compound-lined, double-seamed head and bottom.

For full specifications on all Continental steel containers, contact your nearest Continental representative.

When you purchase steel containers, get the most for your money. This means the best in *service* as well as the best in pails and utility cans. At Continental, we go all out to give you what you're looking for—with our 4-star steel container service.

1 FULL LINE

Whatever product you're buying for, Continental has just the size and style container to fit it. Handi-Cans in 2½ and 5 gal. sizes, lug cover pails from 2 to 12 gal., flaring pails from 3½ to 6½ gal., plus 5 and 6 gal. tight-head pails.

2 QUALITY

Made of heavy-gauge steel in ultra-modern plants, Continental steel containers are thoroughly tested to meet ICC specifications and to conform to CFC/UFC Rule 40. Colorfully lithographed, these sturdy, reusable containers will continue to promote your product long after their original contents have been emptied.

3 RESEARCH

As part of our 4-star service, customer research men are available to help you right in your own plant. In addition, scientists at our Research and Development Center in Chicago are constantly working to bring you new and better packaging ideas—such as Continental's Perma-Linings for hard-to-hold products.

4 QUICK DELIVERY

Just say the word and we'll deliver all the steel containers you can use—any time, any place. Continental's excellent production facilities and carefully selected warehouse points in many sections of the country guarantee better service when and where you need it.

So get full value from your purchasing dollar—with Continental's 4-star steel container service. Call anytime.

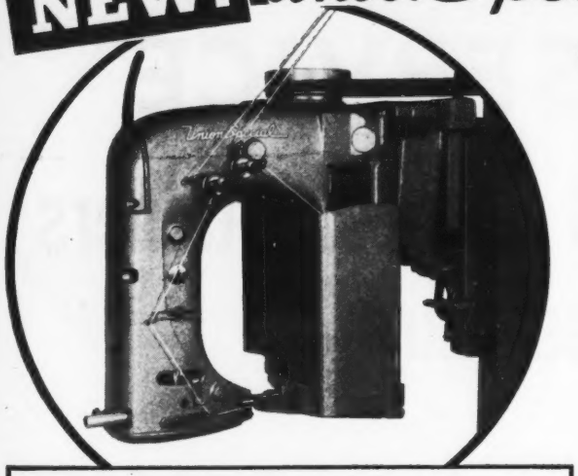
CONTINENTAL CAN COMPANY

Eastern Division: 100 E. 42nd St., New York 17
Central Division: 135 So. La Salle St., Chicago 3
Pacific Division: Russ Building, San Francisco 4

When inquiring check 1754 opposite last page

NEW! Union Special Bag Closer

✓ FASTER ✓ EASIER ✓ SURER



Get These PRODUCTION ADVANTAGES Now

- Increased Operating Speeds.
- Greater Output Capacity.
- "Snug-Tite" Closure.
- Enclosed Automatic Lubrication System.
- Superior Feeding. Easy Threading.

● Here's how to take advantage of these new, high speed *Class 53600* sewing heads Union Special now has available for closing filled bags: (1) Specify them for new installations, (2) Modernize machines you are now using. Of great interest to packing and shipping departments is the increase in speed possible. Rated speed has been increased 50 per cent over older *14500* type sewing heads. Conveyor speeds can be synchronized with the sewing head speed by changing sprocket. Let us give you complete information. *See our nearest representative or write.*

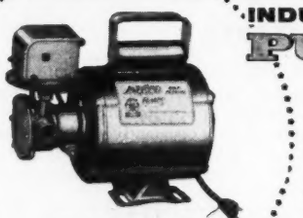
Union Special® MACHINE COMPANY

Worldwide Sales and Service

442 North Franklin Street • Chicago 10, Illinois

When inquiring check 1755 opposite last page

cut pumping costs with JABSCO INDUSTRIAL PUMPS



- INSTANTLY SELF-PRIMING
- SIMPLE, COMPACT, ONLY ONE MOVING PART
- DURABLE NEOPRENE IMPELLER
- SELF-LUBRICATED
- TROUBLE-FREE OPERATION

Model 2187-50
PORTABLE PUMP & MOTOR UNIT
½" Port Size—With Vacuum Switch

JABSCO PUMPS

HERE'S another Jabsco industrial pump — designed and built for chemical, pharmaceutical and other industrial applications. Ideal for transfer of various liquids and acids—sump drainage, coolant pumping, general transfer, pulp in solution, filtering, brines, plating solutions—even fluids containing foreign matter or particles, silt, crystals, and other gritty materials. Bronze, stainless steel or plastic construction is available to *solve your specific* pumping problems. Pumps either light or heavy viscous liquids. Temperature ranges from 35° to 180° F. Write for a Jabsco factory recommendation for your own needs. Specify application, fluid pumped, temperature, pressure, etc.

FREE — send for catalog sheets, detailed information... no obligation, of course!

PATENTED AND PATENTS PENDING

JABSCO PUMP COMPANY
2031 Lincoln Street, Burbank California

When inquiring check 1756 opposite last page

LIGHT BUT SO STRONG!

TOTELINE FIBERGLASS TRAYS

For Drying:
CHEMICALS
PHARMACEUTICALS
ANTIBIOTICS

They're feather-light, but they're durable and sturdy as any trays you've ever used! What's more, the large inside corner radii makes them very easy to clean. And, because fiberglass does not absorb heat, the materials dry faster in Toteline trays. Many sizes available. Write

TOTELINE Wherever materials are handled

MOLDED FIBERGLASS TRAY CO.
World's largest producer of Fiberglass reinforced resin Trays, Tote Boxes
LINESVILLE, PENNSYLVANIA

When inquiring check 1757 opposite last page

CO_2 Evaporation Losses Cut

(*Continued from preceding page*)

Blocks are loaded tightly against each other to prevent air circulation. Cars are metal lined, welded. Side wall thickness, mainly insulation, is about 24".

Side walls, after preparation to insure flatness, are covered with light gage sheet metal to act as additional moisture membrane. Sheets of insulation are dipped in hot, oxidized asphalt and placed into position. After first layer, small skewers are used to fasten sheets in place while asphalt is drying. Joints are staggered and wall junctions are stepped back to insure no through joints of insulation. After final layer is emplaced, surface is sprayed with hot asphalt, then T&G wood is installed. Final finish is welded galvanized lining.

Floor thickness of insulation is 10", side wall is 14", roof is 8", car ends are 12". These thicknesses are made up of 3" and 2" thick sheets of insulation. Behind the insulation are varying thicknesses of glass fiber insulation (towards the outer wall). Total wall insulation, then, is 20", floor insulation is 16", roof is 17", ends are 18".

Results: Olin Mathieson, first to use this material for insulating dry ice transportation equipment, feel that they now have as modern rail equipment as can be obtained. They foresee no changes in type and method of insulating the special dry ice compartment.

A careful check of the first shipment insulated with synthetic rubber insulation indicated daily evaporation losses of only ¾ of 1% per day. Daily savings of salable dry ice, at destination, amounted to approximately $50 for every day under load, as compared with older cars. In addition, this lower evaporation loss has been maintained because of the greatly decreased water pick-up of the insulating material.

Basically the same design, with modification required for weight restrictions, is used in Olin Mathieson's dry ice delivery trucks and trailers.

(Rubatex insulation hardboard is manufactured by Rubatex Division, Great American Industries, Inc., Dept. CP, Bedford, Virginia . . . or for more information check 1758 on form which is located opposite last page.)

for VIPs only . . .

turn back for important message . . .

. . . on page 81

Print identification labels as you need them

Label printing machine cuts costs and eliminates label inventory and storage problems

Uses: Machine prints labels and fills in variable data such as size, weight, color, and date at the same time.

Features: Printing head, including ink fountain, can be easily removed and a stencil-printing drum substituted for printing shipping labels,

Label-printing machine needs no cleaning, and printing experience is not required to operate

packing slips, and other small forms. Unlike a printing press, label printing machine never needs cleaning.

Description: Unit, about size of electric typewriter, prints 105 labels per minute, complete with variable information. Inexpensive rubber printing plates are made to user's specification. Variable information is printed from sticky-back rubber type that can be added and removed as needed. Labels from ½x2″ up to 4⅛x6″ can be printed. Fade-proof, waterproof ink that air-sets and dries instantly is used. Inks are available in wide range of colors, and gummed, ungummed, or cloth printing stock or pressure-sensitive tape may be used. Automatic preset counter keeps exact count and shuts machine off when run is completed. Easily operated, label printing machine requires no previous printing experience.

A 9x20″ table area is needed for the machine which is only 11″ high.

(Model 80 label printing machine is manufactured by Weber Marking Systems, Division of Weber Addressing Machine Co., Inc., Dept. CP, Mount Prospect, Ill. . . . or for more information specify 1759 on form opposite last page.)

"Another product safely shipped in Inland 'protection-eered' containers"*

That's easy! Mr. Smith is about to paint a swimming pool with ordinary house paint! Those who know . . . use a special paint. A paint such as Ramuc Pool Enamel made by Inertol Co., Inc., Newark, New Jersey. Inertol knows, too, that it would be a commercial "faux pas" to rely on ordinary shipping containers to keep their special, protective paints free from discoloration and contamination. That's why they use Inland "protection-eered" containers specially lined to maintain the purity of their products during transit, storage and use.

Do you have packaging problems? Why not let Inland's lining experts help you solve them. Write for complete details to Bob Boecher, Dept. 330C.

**the right container, with the right lining for your product*

INLAND STEEL CONTAINER COMPANY

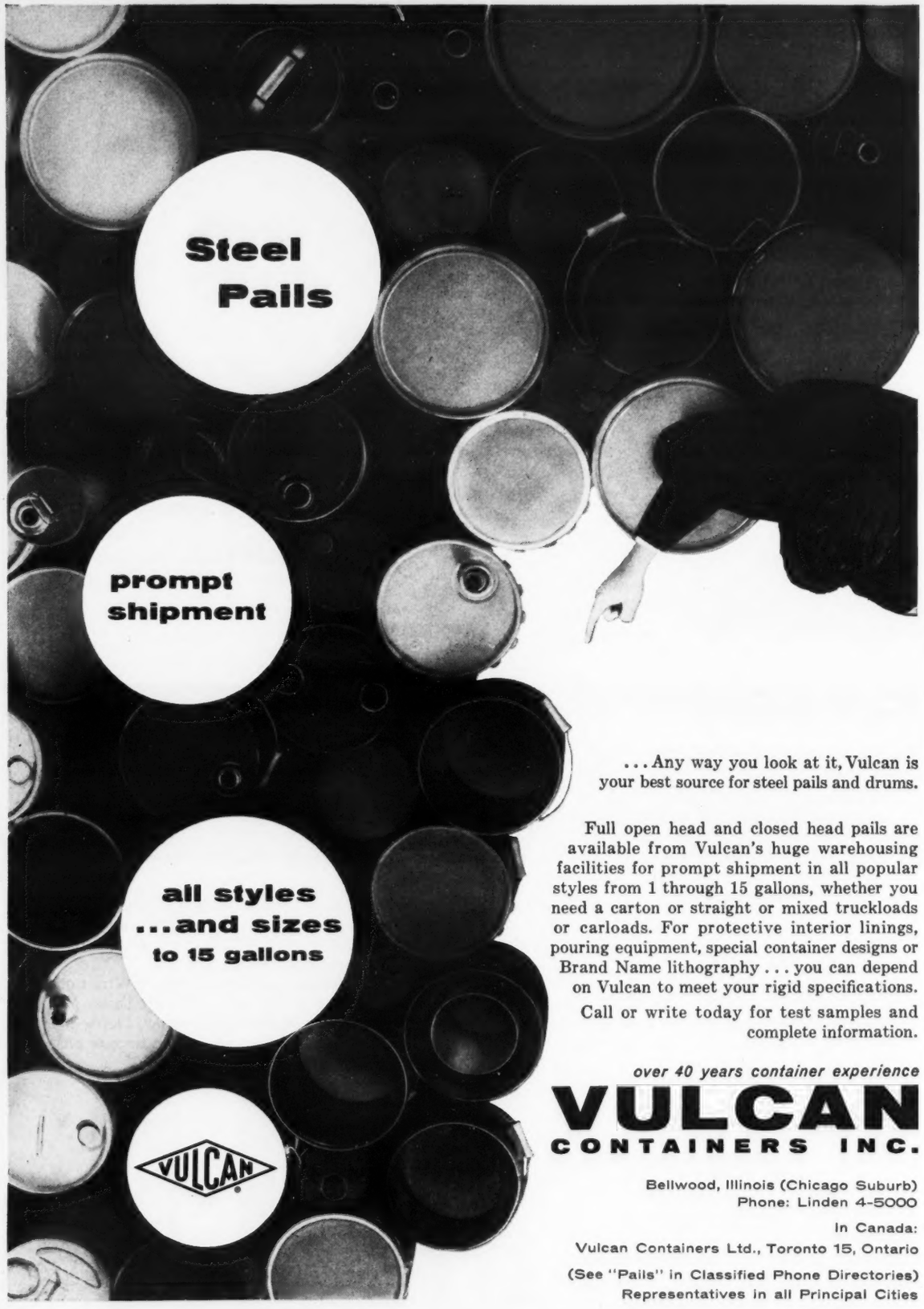
Division of Inland Steel Company • 6532 South Menard Avenue • Chicago 38, Illinois • Plants: Chicago, Jersey City, New Orleans, Cleveland and Greenville, Ohio

Full line of steel and stainless steel shipping containers, including galvanized and heavy duty ICC drums.

INLAND

"It's Better to Ship in Steel"

When inquiring check 1760 opposite last page



...Any way you look at it, Vulcan is your best source for steel pails and drums.

Full open head and closed head pails are available from Vulcan's huge warehousing facilities for prompt shipment in all popular styles from 1 through 15 gallons, whether you need a carton or straight or mixed truckloads or carloads. For protective interior linings, pouring equipment, special container designs or Brand Name lithography . . . you can depend on Vulcan to meet your rigid specifications.

Call or write today for test samples and complete information.

over 40 years container experience

VULCAN CONTAINERS INC.

Bellwood, Illinois (Chicago Suburb)
Phone: Linden 4-5000

In Canada:
Vulcan Containers Ltd., Toronto 15, Ontario

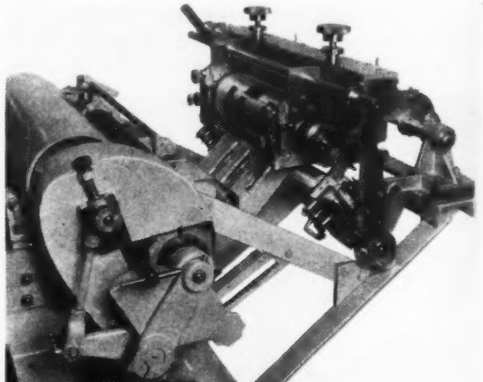
(See "Pails" in Classified Phone Directories)
Representatives in all Principal Cities

When inquiring check 1761 opposite last page

Attaches to wrapping machine, prints legend on film, paper

Uses: Unit attaches to any standard wrapping or bundling machine, imprints any changeable legend on wrapper as an integral part of packaging operation. Unit is being used for applying code-dates, colors, and other supplementary copy on wrappers of cellophane, other films and paper.

Features: Printer incorporates a flexographic printing system that uses fast-drying liquid inks



Units are available to produce imprints up to 24"

of any color. Units provide for either random imprints or accurate registration of imprints in any desired position on package.

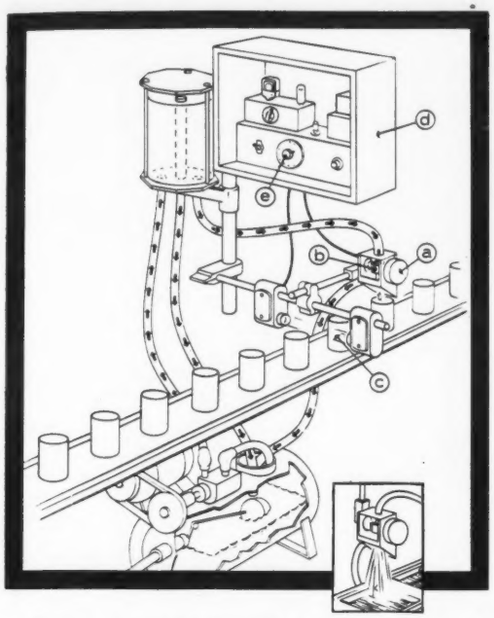
Description: Operation is completely automatic and can be synchronized with parent machine at any standard production speed. Unit is available in various sizes to produce imprints up to 24" wide and can be readily changed for different cut-off or repeat lengths.

(Imprinter is manufactured by Adolph Gottscho, Inc., Dept. CP, Hillside 5, N. J. . . . or for more information check 1762 on form opp. last page.)

Fill quantity controlled by electronic timing

Liquid dispenser handles ascorbic acid, oils and other liquids on continuous can filling line.

Heart of unit is dispensing head (a) through which continuous flow of material (b) re-circulates at constant rate. When can or jar interrupts photoelectric beam (c), switch in control box (d) is operated. This causes deflector in dispensing head to move out of path of material flow to the can line. After an electronically timed interval, deflector moves back and diverts material flow.



Quantity of material dispensed is measured by time rather than displacement

Quantity of material dispensed is measured by time rather than displacement. Electronic controls measure exact time intervals, in rapid succession, responding to settings on master dial (e).

(Flocron is available on lease basis from the Morton Salt Company, Dept. CP, 120 S. LaSalle Street, Chicago, Ill. . . . or for more information check 1763 on form opposite last page.)

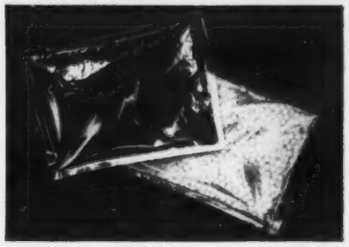
Idea submitted by Conrad Berenson, Stamford Research Laboratories, American Cyanamid Company, Stamford, Conn.

WORLD'S TOUGHEST PACKAGING FILM?

IT'S HEAT-SEALABLE! "Scotchpak" Brand Polyester Film takes a seal as tough as the film itself. It's a perfect material for many critical packaging jobs where inertness of the wrapper and protection of the contents under temperature extremes are critical. "Scotchpak" Film resists most solvents and chemicals; has high moisture inertness, high tensile strength, and heat seals easily at 275° to 359° F., 20—60 psi. You can use it for packaging such varied products as cosmetics, acids, syrups, silverware, oils, greases, adhesives, asphaltics, catsup and mustard, surgical dressings, and many others . . . even use it for container liners and insulation pillows. For more information, send for folder described at right.

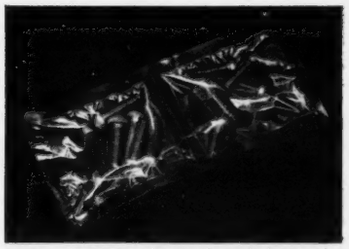
TRADEMARK
"SCOTCHPAK"
BRAND
HEAT-SEALABLE
POLYESTER FILM

Look what you can do with it!



ACIDS or volatile chemicals can be packaged easily, handled safely, shipped without fear in heat-sealable containers of new "Scotchpak" Polyester Film. Also lines drums and cartons.

FOOD ITEMS are packaged safely in clear-as-glass "Scotchpak" Film. Contents can be frozen . . . even boiled *right in the package*. Low gas penetration rate . . . inert and non-toxic.



METAL PARTS can be packaged dry or in oil or grease to protect them against corrosion. Transparent packages are easy to handle, easy to ship and to store. Simplifies issuing of parts and units.

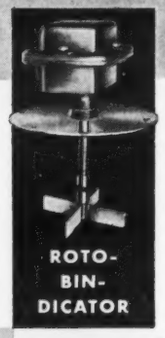
FREE FOLDER shows dozens of ways you can solve your most difficult packaging and shipping problems with new "Scotchpak" Polyester Film. Just write on your letterhead: Film Products Group, 3M Co., St. Paul 6, Minn., Dept. OL-27.

The term "SCOTCHPAK" is a trademark of Minnesota Mining and Manufacturing Co., St. Paul 6, Minn. Export Sales Office: 99 Park Ave., New York 16, N. Y. In Canada: P. O. Box 757, London, Ontario. © 3M Co., 1956.

When inquiring check 1764 opposite last page

BULK MATERIAL CONTROL
under
Pressure or Vacuum

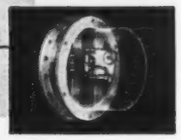
New Roto-Bin-Dicator mounts outside bin, at any angle, for bin level signaling or machinery control. Material loads on paddle actuate Micro switch in motor housing. Flexible paddle shaft permits use with large or lumpy materials. **Explosion-Proof U. L. Listed Units Now Available.**



ROTO-BIN-DICATOR

BIN-DICATOR

BIN-FLO AERATOR



Low pressure air diffuser assures steady flow of fine, dry materials that tend to pack in storage.

The original diaphragm-type bin level indicator for all ordinary applications.

Complete Illustrated Literature FREE

THE BIN-DICATOR CO.
13946-D Kercheval • Detroit 15, Mich.
Phone: VAlley 2-6952

WE SELL DIRECT • PHONE ORDERS COLLECT

When inquiring check 1765 opposite last page

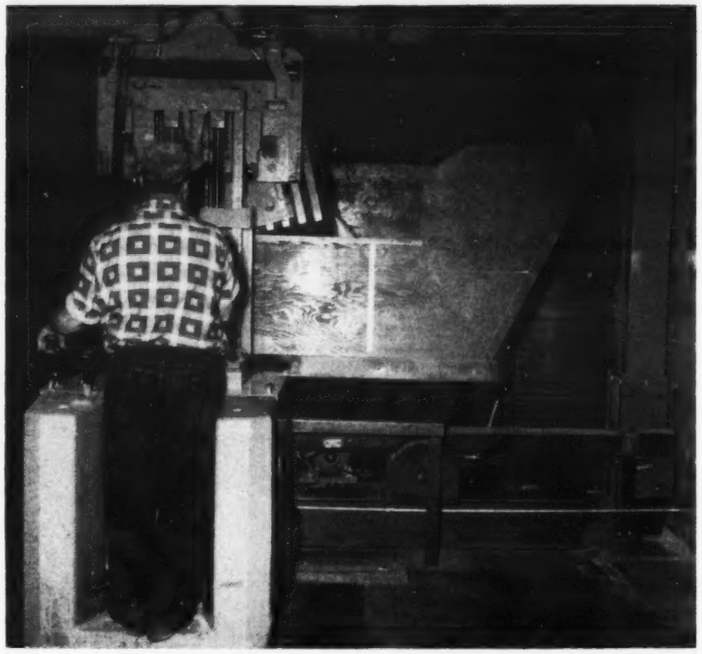
MAGLINER MAGNESIUM PALLET DOLLIES are the economical, practical answer to faster pallet handling and lower loading costs. On the loading dock, in the plant or warehouse, they pay big dividends—because they keep pallet loads moving . . . stock movement fluid!

Made of magnesium, Magliner pallet dollies are *light*, easily carried by one man, and get back to the loading point fast. They're strong, tough, rugged—of welded channel construction, for dependable, long-life service. Available in fourteen standard models and in 2,000 and 4,000 lb. capacities.

Write today for Bulletin P8-1
MAGLINE INC.
P. O. Box 302, Pinconning, Mich.

Canadian Factory: Magline of Canada, Ltd., Renfrew, Ontario

When inquiring check 1766 opposite last page



Material is dumped into bin from which it is carried by vibrating conveyor to bucket elevator, then to plant's third floor

Handling of bisulfate of soda and trisodium phosphate in hopper cars, use of storage bins and bucket elevator permits Climalene Company to . . .

cut unloading ti

Problem: Climalene Company, Chicago detergent and cleaning compound manufacturer previously received bisulfate of soda and trisodium phosphate in bags. However, recent production increases have made it possible for Climalene to take advantage of bulk material prices, receiving material in hopper cars.

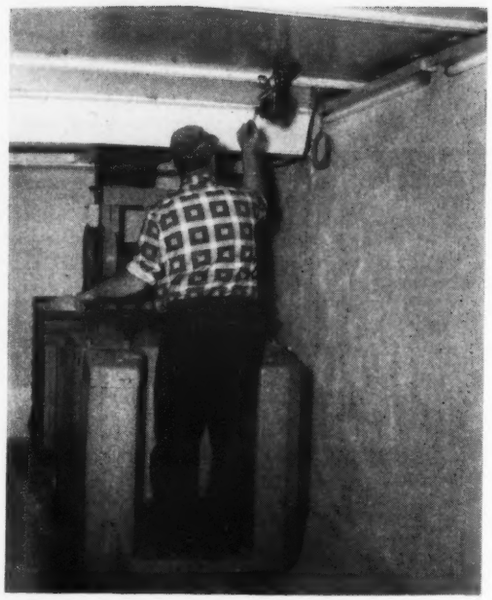
Storage of the material, however, presented something of a problem. Materials have a tendency to pressure-set and silo or other bulk storage might have required elaborate agitation equipment. And, of course, silo construction would have been rather expensive.

Solution: Climalene arranged to receive material in hopper cars which are emptied by gravity into the plant's basement. A pit six feet wide and seven feet deep was dug and walled with concrete, extending from the basement outward under the switch track at the basement floor level.

Material empties into small hopper under the rails. From this hopper the material falls into specially

(*Please turn to page* 148)

Material is stored in steel bins in basement until needed at third floor manufacturing area



Operator releases material from primary receiving bin into hopper mounted on truck

ling time substantially

TRACTOR SHOVEL FLEXIBILITY SOLVES MANY MATERIALS HANDLING PROBLEMS

One big advantage of a tractor shovel over other methods of handling bulk materials is *flexibility*. This contributes to increased efficiency and greater production. The Allis-Chalmers 1½-yard HD-6G, with outstanding versatility and all-round performance, will help your material handling operations in many ways.

First, its adaptability allows it to fit your present setup. It is seldom necessary to change plant layout or make costly installations. At the same time, you avoid the cost of a plant shutdown while instailations are being made.

Second, the HD-6G travels wide areas and works in most any footing. This means your storage areas are not confined within the limits of a fixed structure. The HD-6G stockpiles material, later moves it to any other location at will.

In addition to its primary job, the HD-6G is an extremely valuable machine for general maintenance and countless other odd jobs. Among these are yard road maintenance, spotting cars, excavating for new construction, handling many types of waste, cleaning snow from roads and parking areas, and building fire walls.

Your Allis-Chalmers dealer will show you, at your convenience, the many new design features that make the HD-6G the best tractor shovel value, pound for pound, anywhere.

Write for FREE catalog.

ALLIS-CHALMERS
CONSTRUCTION MACHINERY DIVISION
MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS

When inquiring check 1767 opposite last page

Conveys packages, bags around corners

Uses: Conveying bagged material or packages.

Features: Eliminates need for

Conveying surface consists of spring belts over grooved rollers

transferring-stations since conveyor can be fitted around almost any obstruction.

Description: Curved, powered conveying surface consists of steel spring belts on 1¼" centers, running over grooved rollers. Units can be built to make S- or U-turns to a 5-ft radius.

Standard widths are 18, 24 and 32". Available is flexible curve which will deliver to left or right and which can be raised or lowered while running. This unit can also be hinged or furnished with gate openings at any point.

(Curved conveyors are manufactured by Power-Curve Conveyor Co., Dept. CP, 2185 S. Jason St., Denver 2, Colo. Check 1768.)

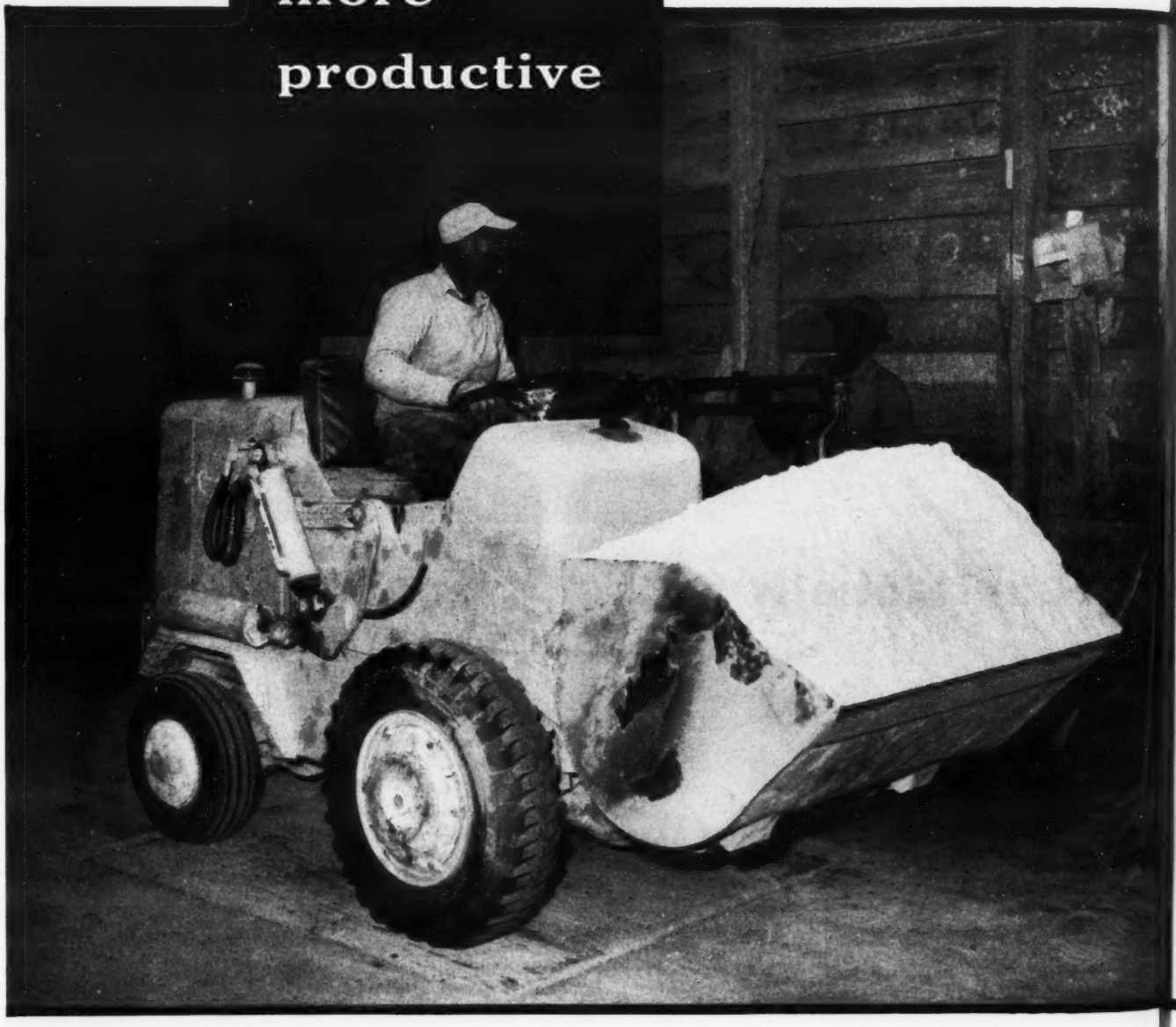
Hoppers, stands make elevator versatile . . .

cast aluminum buckets available in sizes to 6x3½"

Uses: Portable bucket conveyer is designed to handle dry, flowable material on either permanent or temporary operations.

Features: Unit is available with telescoping landing gear that permits conveying material at a 45 to 90 degree angle.

make your operators more productive



"Our new 'PAYLOADER' does the work of two machines," says Ernest Dickerson, Valiant Fertilizer Company.

these new PAYLOADER® models ...deliver more per man hour

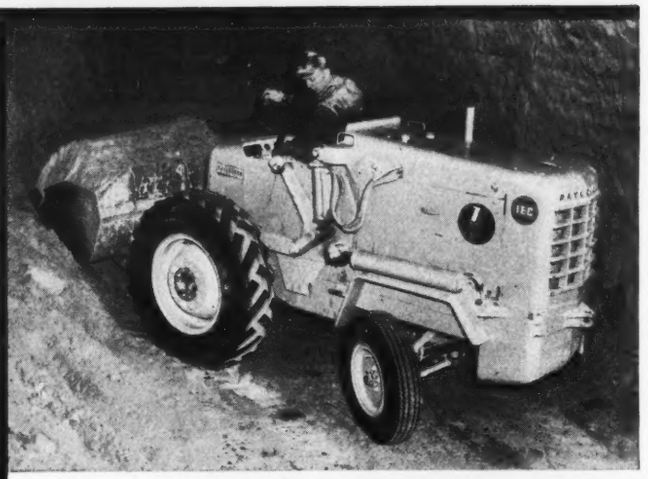
More competitive markets, tighter labor supplies and rising labor costs are conditions that industrial management will probably have to contend with for some time to come.

How to keep up with production demand and hold down production costs in spite of these three pressures? One proven solution is to increase output per man by providing your operators with the most modern, most productive machines available.

In terms of tractor-shovels for bulk or loose-material handling this means "PAYLOADER" tractor-shovels. Because they are built by the pioneer and leader in the tractor-shovel industry there are *more* "PAYLOADER" units in use than all other makes combined. Many industrial plants that have been "PAYLOADER" users for years tell us that it has paid them to replace older units with the new "PAYLOADER" models from the standpoint of greater production alone — that they not only handle more tonnage than earlier models but are way ahead of other tractor-shovels in design and the featuers that make them MORE PRODUCTIVE.

A Complete Line with Exclusive Features

The complete "PAYLOADER" line includes sizes for every purpose, including big 4-wheel-drive types up to 2¼ cu. yd. bucket capacity. Model HA (18 cu. ft.) and HAH (1 cu. yd.) are front-wheel-drive types especially suited to fast material handling indoors and in yards. Rear-wheel steering and compact design gives them short-turning ability for easy maneuvering in close quarters. Exclusive one-lever bucket control on the model HA and power-steering on the larger HAH contribute greatly to ease of operation. Their distinctive roll-back bucket action gets full loads quickly and, combined with hydraulic load-shock-absorber, enables them to move full loads faster without spillage — enables them to dig more, carry more and deliver more tons per hour than heavier machines with larger engines. Lift fork, pusher fork and floor sweeper attachments are also available to increase their usefulness. Your nearby "PAYLOADER" Distributor wants to prove on *your* work what a modern "PAYLOADER" can do to move more materials at less cost.



Model HAH handling Super phosphate at Longaker Mills. "Moves 60 tons per hour on a 100 foot haul — does the work of 3 older units."

"New HA loads faster and handles more material than older machines — operate easier with increased operator safety," says A. W. Stone, Superintendent.

PAYLOADER®
MANUFACTURED BY
THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

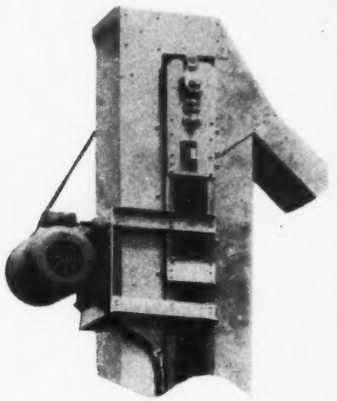
THE FRANK G. HOUGH CO.
744 Sunnyside Ave., Libertyville, Ill.

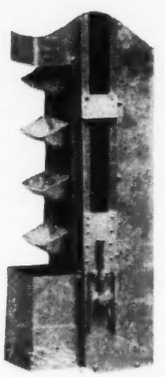
Send full data on "PAYLOADER" tractor-shovels as follows:

☐ Model HA (18 cu. ft.) ☐ Model HAH (1 cu. yd.)
☐ Larger models to 2¼ cu. yd.

Name _____
Title _____
Company _____
Street _____
City _____ State _____

Description: Conveyor is available with cast aluminum buckets in sizes up to 6x3½" on centers to meet individual material specifications. Belt speeds can be varied to meet requirements. Attachments such as hoppers, landing gear, stands and discharge conveyors are



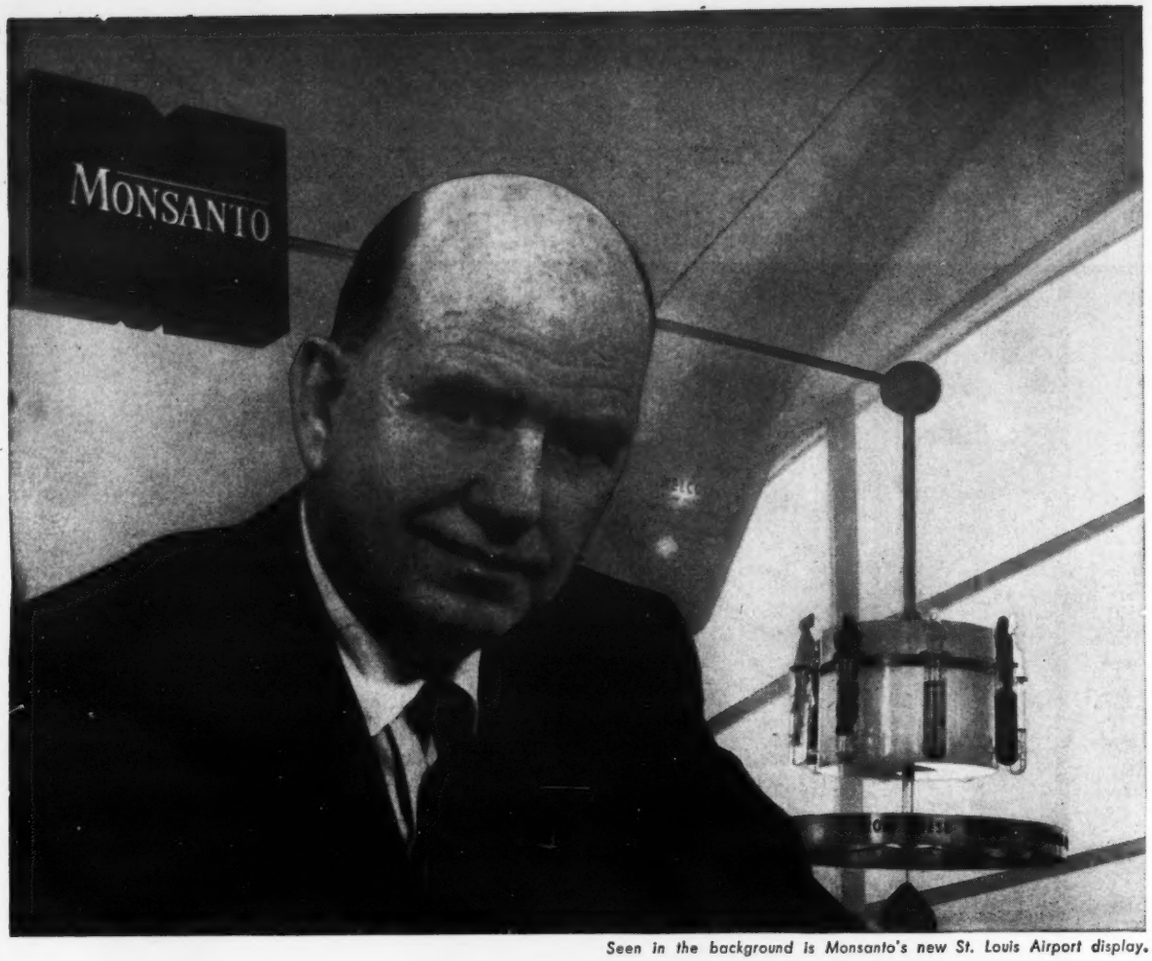


Attachments such as hoppers, landing gear, stands, and discharge conveyors are available

available. Constructed of aluminum alloys, unit is powered by a ½ or 2 hp electric motor. Conveyor is available in lengths up to 12 ft for heavier material and longer lengths for lighter commodities.

(Bucket is manufactured by Phillips Conveyer Company, Dept. CP, Memphis, Mo. Check 1769 opposite last page.)

For more information on product at left, specify 1770 . . . see information request blank opposite last page.



Seen in the background is Monsanto's new St. Louis Airport display.

"Business Publications help us keep tuned to our markets"

says CHARLES ALLEN THOMAS, President, MONSANTO CHEMICAL COMPANY

"Our business is so diverse," continues Mr. Thomas, "that it would be impossible to keep abreast of shifting market needs without the help of business publications. Our top executives – and our down-the-line people, too – consider business publication reading a necessary routine."

You will find that top men like Mr. Thomas, in *every* industry use business publications as a prime source of information about their own industry and their markets. And they not only read the editorial content, but they also place equal weight on your advertising message – for there, too, they find valuable information that can help them in their business.

That's why business publication audiences are *interested* in your advertising message. And that's why these publications are direct sales routes for your product or service.

Write for list of NBP publications – see how you can pin-point your market through the use of these technical, scientific, industrial, merchandising and marketing magazines.

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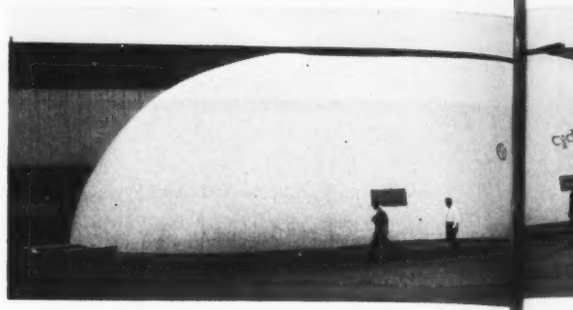


air-supported contains

Uses: Unit is designed for temporary, all-weather, low-cost storage.

Features: Collapsible building is lightweight and fireproof. It can be put up rapidly and moved easily from one location to another.

Description: Pneumatically-supported building is 80 feet long, 40 feet wide, and 20 feet high. It contains more than 64,000 cubic feet of storage space, and weighs about 400 pounds. Made of paper-thin, vinyl-coated nylon fabric panels (called Fiber-thin), dome-shaped building can be erected by three men in one hour.

Low air pressure supports structure. No rigid metal or wooden supports are needed to keep walls and roof stable and under tension. Building is securely anchored to ground by 15-inch-diameter fabric tube extending around base and containing 23,000 pounds of water. Fabric walls and roof permit entry of sufficient sunlight to engage in storage activities without artificial lighting.

To erect building, fabric is spread flat on ground. Air from compressor or blower is injected into fabric at controlled low pressure. Air pressure bulges structure upward and outward, and tension keeps walls and roof taut. Compressor maintains constant pressure, enabling building to keep its shape even when door is opened to permit entry of fork lift trucks. Air compressor also acts as air-conditioning unit. Building is strong enough to withstand high-velocity winds and its roof will support heavy load of snow.

Fabric resists scuffing, sunlight, weathering, oils, gasoline, most acids, alkali, and salt water. It has

A pneumatically supported portable warehouse, large enough to hold 2,000,000 pounds of packaged goods, weighs only 400 pounds

portable warehouse 64,000 cu ft of space

answer to warehousemen's need for low-cost, low-maintenance, flame-resistant, temporary storage

dimensional stability and resistance to cracking, flame, water, and puncturing.

("Airhouse" portable warehouse is manufactured by Coated Fabrics Dept. of Footwear and General Products Div., United States Rubber Co., Dept. CP, Main and Rice Sts., Mishawaka, Ind. . . . or check 1772 opposite last page.)

Deflated portable warehouse can be assembled by three men in one hour, with the aid of blower

...new yardstick for measuring profits!

Towmotor Mass-Handling—moving more units faster, at lower cost—can well be the investment that promises greatest improvement in your future profits, as you face continually rising costs and a shrinking manpower pool.

Integrating Towmotor lift trucks in your departmental operations lets you *supplement* your personnel without adding to your payroll. Enables your men to do a bigger day's work *easier*. Sends them home *fresher*. Permits each one to handle jobs you'd pay a *crew* to do!

Have you seen the new Towmotor lift trucks lately? They offer a wealth of "first-time" features such as:

- Fatigue-free adjustable seating
- Motion-saving "centralized control"
- Maximum free lift that tops all
- No-loss hydraulic lifting action
- Power steering that saves 80% of operator's efforts

Get Bulletin SP-23 on new Towmotor lift trucks from Towmotor Corporation, Cleveland 10, Ohio.

Leaders for 38 years in building Fork Lift Trucks, Tractors and Carriers

TOWMOTOR - GERLINGER
THE ONE-MAN-GANG

Gerlinger Carrier Company, Dallas, Oregon, is a subsidiary of Towmotor Corporation, Cleveland 10, Ohio

When inquiring check 1773 opposite last page

Bulk $NaHSO_4$, TSP Handling

(*Continued from page* 142)

built sift-proof steel bins handled by electric-driven industrial truck.

Truck with bin on its forks is run directly under the tracks to receive its load. Slide gate at the bottom of the receiving hopper is operated with an air cylinder and is so constructed that the operator can control the filling of the bin without leaving the truck. As bins are loaded, they're tiered three high in a temporary storage area.

Truck is equipped with revolving-carriage fork attachment which permits it to dump material into automatic feeding bin as it is needed in process. Bin is emptied by oscillating conveyor and bucket elevator which lifts material to the manufacturing area on the third floor.

Results: Approximately 2¼ minutes is required to load one of these bins with from 1600 to 2200 pounds of chemicals (depending on density of material) and transfer it to the temporary storage area. A 110,000 pound carload can be unloaded and stored by one operator in less than three hours.

(Industrial truck with revolving carriage fork attachment is manufactured by Automatic Transportation Company, Div. Yale & Towne Mfg. Co., Dept. CP, 101 West 87th Street, Chicago 20, Ill. . . . or for more information check 1775 on form opposite last page.)

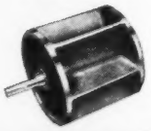
Large secondary dust collectors at National Lime and Stone Company, Carey, Ohio, are served by six Prater Rotary Airlocks. Photo courtesy Dustex Corporation.

PRATER ROTARY AIRLOCK FEEDER

important in the process plan

. . . for increasing efficiency of dust collectors, bag filters and spray dryers. The closed-pocket rotor design with blades and side-plates as one unit, together with double shaft seals and extra sturdy construction, not only insures better air seal . . . it definitely means smoother and better operation of such equipment.

Available in 8, 10 and 12-inch sizes, the Prater Airlock Feeder saves money in handling practically any finely ground or granulated material including the most highly abrasive substances. Write for illustrated brochure.



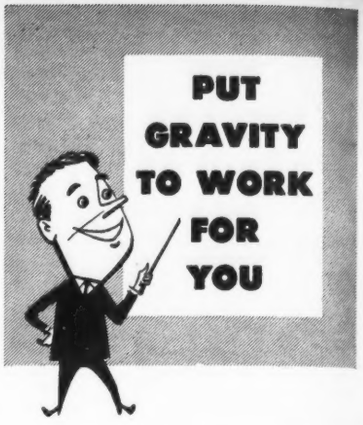
CLOSED POCKET ROTOR
Side plates and rotor blades are cast as a single unit for better sealing and longer life. Recommended for both soft and abrasive materials.

OVERSIZED BEARINGS
Self-contained, extra large self-aligning bearings lubricated and sealed for life. Standard on all heavy duty Prater Rotary Airlock Feeders.

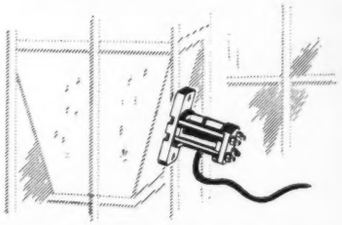
WHAT'S YOUR PROBLEM? Jot down the details of your application and mail to us. Our engineers will help you plan your flowsheet and specify proper equipment.

PRATER PULVERIZER COMPANY
1513 S. 55th Court, Chicago 50, Ill.

When inquiring check 1774 opposite last page



Gravity is the cheapest prime mover available. It will empty bins, convey materials, aid in transportation . . but it can't solve the problem of handling dry or viscous materials.



It takes the engineered application of Cleveland Vibrators to break up the frictional forces which cause adhesion and jamming. Vibration keeps materials moving in a full and controlled flow.

Cleveland Vibrators can be installed on all types of equipment for handling and processing chemicals. We will be happy to give you detailed data for your specific application, or a catalog for your reference files.

Air or Electric
Portable or Permanent
Silent or Standard

2706 Clinton Avenue • Cleveland 13, Ohio

When inquiring check 1776 opposite last page

Industrial trailer tractors operate on LPG . . .

results in easy starting, long engine life, no exhaust fumes, and low oil consumption

Uses: Hauling plant tractor-trailer trains.

Features: LPG operation results in easy starting, long engine life, moderate maintenance costs, no obnoxious exhaust fumes, and low oil consumption.

Description: Components of LPG system are filter, carburetor, solenoid valves, regulator, carburetor adaptor, and supply tank. Their simplified construction makes maintenance relatively easy. Each

Liquefied-petroleum-gas tank, located behind operator, is readily accessible

is placed for easy removal and convenient servicing. High compression ratios assure maximum power available with this type of fuel. Stellite valves and inserts and positive valve rotors add to engine life.

(Huskie Models 930 & 940 and Super-Huskie Model 950 industrial tractors are manufactured by Mercury Manufacturing Co., Dept. CP, 4044 S. Halsted St., Chicago 9, Ill. . . . or for more information check 1777 on form which is located opposite last page.)

Gives information on pumps for hydraulic ash handling

Data sheet of 12 pages uses photographs, schematics, and line drawings to illustrate design, construction, and operation of abrasion-resistant centrifugal pumps for hydraulic ash-handling systems. Tables give pumping capacities and related data, including friction loss in pipe and fittings.

Data Sheet Pa is issued by The Allen-Sherman-Hoff Co., Dept. CP, 259 E. Lancaster Ave., Wynnewood, Pa. When inquiring specify 1778 on form opposite last page.

The AIRVEYOR®

goes up over and around ...anywhere

No matter how tortuous the route from your plant's unloading dock to storage, to processing, The Airveyor will give you trouble-free conveying of your dry pulverized or granular materials by air, with an efficiency that will cut — appreciably — your annual handling costs.

With the Airveyor system *nothing moves but the material.* There are no belts, buckets, screws or other mechanical devices to get out of order. The Airveyor flows your material through sealed pipes, by air. Inhalation and dust hazards are eliminated, and the Airveyor is self-cleaning for maximum sanitation. As there is no waste, no spillage, this alone can represent considerable savings. In addition, the Airveyor offers the dual advantages of simplicity in construction and operation—one man can direct the flow of material to any point. And after installation your only cost is for air.

Designed for use alone, or with other Fuller Systems, the Airveyor can be precisely matched to your operation, whether it is large or small. Write today for the factual story on efficient conveying by the Airveyor as the first step toward lowering the boom on the high cost of handling materials in your plant.

FULLER COMPANY GENERAL AMERICAN TRADE MARK

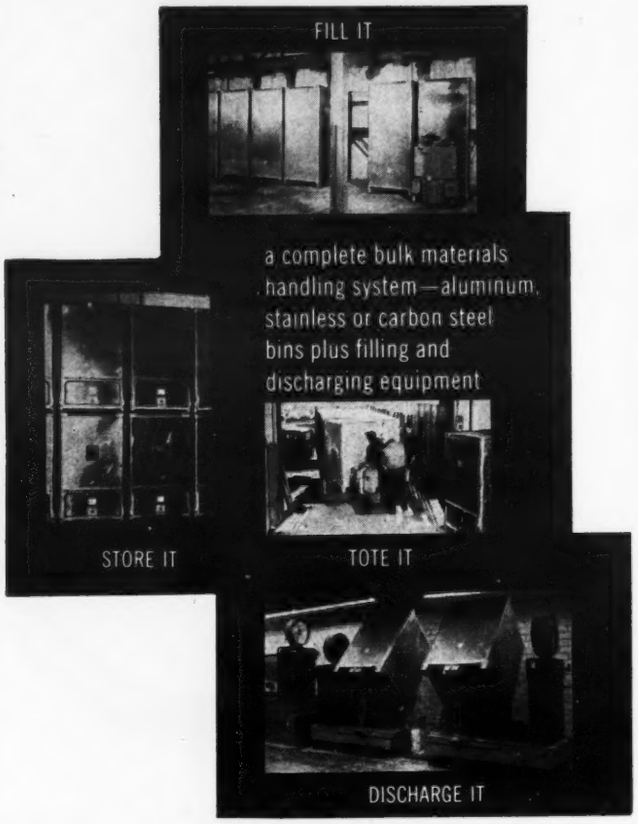
3014
A-225

Fuller
. . . . pioneers in harnessing AIR

FULLER COMPANY
136 Bridge St., Catasauqua, Pa.
A SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORP.
Chicago • San Francisco • Los Angeles • Seattle • Kansas City • Birmingham

When inquiring check 1779 opposite last page

TOTE SYSTEM*


FILL IT
a complete bulk materials handling system—aluminum, stainless or carbon steel bins plus filling and discharging equipment
STORE IT
TOTE IT
DISCHARGE IT

first...

- To bring you a new, more efficient method of bulk materials handling
- In number of installations
- In sanitation
- In flexibility
- In compactness
- In savings
- To offer the CONTAINER CAR which simply and cheaply solves bulk delivery problems of off-rail users

Want to know how Tote System fits your picture? Write for illustrated literature, or ask for a survey by Tote engineers. No obligation.

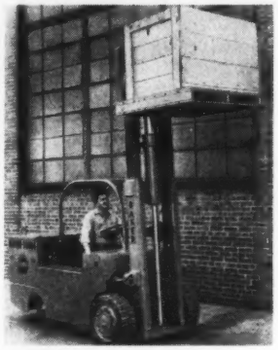
TOTE SYSTEM, INC.

*Tote and Tote System Reg. U.S. Pat. Off.

680 So. 7th, Beatrice, Nebraska

When inquiring check 1780 opposite last page

Fork truck has low silhouette can enter trailers, RR cars



Safe design prevents operator from incurring head injury

Uses: For safe loading of closed highway trucks and trailers.

Features: Truck needs only six feet of clearance, yet operator's seat is 38 inches below top of mast. Even if operator is over six feet tall, his head will be below top of mast and danger of head striking low overhead is eliminated. Truck has high stability.

Description: Capacity is 6000 lb and overall height is 68 inches. Truck has foreward tilt of 5° and rear tilt of 10°. Turning radius is 99 inches, and maximum lift is 97 inches. Travel speed, with load, is 4.0 mph.

(Type FTDL-60 fork truck is product of Baker-Raulang Co., Div. of Otis Elevator Co., Dept. CP, 1250 W. 80th St., Cleveland 2, Ohio . . . or for more information check 1781 opposite last page.)

Millions of miles of paper now being saved each year . . .

bumper pads, filled with polyurethane foam, prevent damage when moving heavy rolls

Until recently, shipping of newsprint presented a problem. Newsprint rolls weigh some 1800 pounds and have to be toppled and rolled in loading and unloading. Hundreds of feet of paper from each roll had to be discarded because it was torn and wrinkled on the edges and could not be run through presses.

Many types of bumper pads were tried, but they lacked the resilience to withstand crushing impact of the toppled newsprint rolls. Also, in most cases, these pads were so heavy they required two men to put them in place.

The use of Stafoam, a polyurethane material, was suggested by the American Latex Products Corporation. This material has a "memory" factor ranging from instantaneous to several minutes — "slow memory" Stafoam may take as long as 180 seconds to return to its original shape following sharp, heavy impact. It was tested and found suitable for bumper pad use.

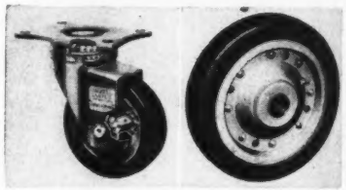
LIGHT, MEDIUM and HEAVY DUTY CASTERS

Precision-built

DARNELL

CASTERS AND WHEELS

for Better Performance ...longer life!



These Quality Features!

RUBBER TREADS . . . a wide choice of treads suited to all types of floors, including Darnelloprene oil, water and chemical-resistant treads, make Darnell Casters and Wheels highly adapted to rough usage.

RUST-PROOFED . . . by zinc plating, Darnell Casters give longer, care-free life wherever water, steam and corroding chemicals are freely used.

LUBRICATION . . . all swivel and wheel bearings are factory packed with a high quality grease that "stands up" under attack by heat and water. Zerk fittings are provided for quick grease-gun lubrication.

STRING GUARDS . . . Even though string and ravelings may wind around the hub, these string guards insure easy rolling at all times.

- - - you'll want these facts

WRITE FOR A COPY TODAY!

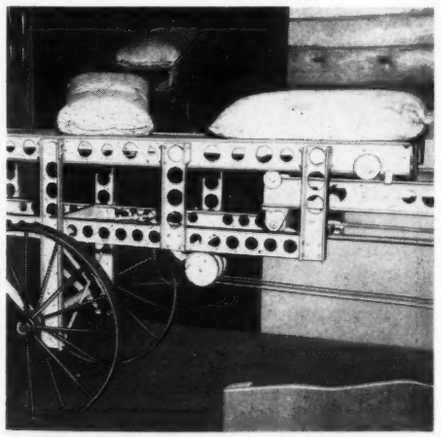
DARNELL CORPORATION, LTD.
DOWNEY (LOS ANGELES COUNTY) CALIFORNIA
60 WALKER STREET, NEW YORK 13, NEW YORK
36 NORTH CLINTON STREET, CHICAGO 6, ILLINOIS

When inquiring check 1782 opposite last page

Polyurethane-filled bumper pads are light enough to be handled by one man

Resulting bumper pads are wedge-shaped, canvas-covered, and weigh only 35 pounds. Tapering at one end provides good landing platforms on which to topple newsprint rolls without costly damage to the edges.

(Flexo-O bumper pads are manufactured by Biltrite Sailmakers, Dept. CP, Long Beach, Calif. . . . or for more information check 1783 on form opposite last page.)

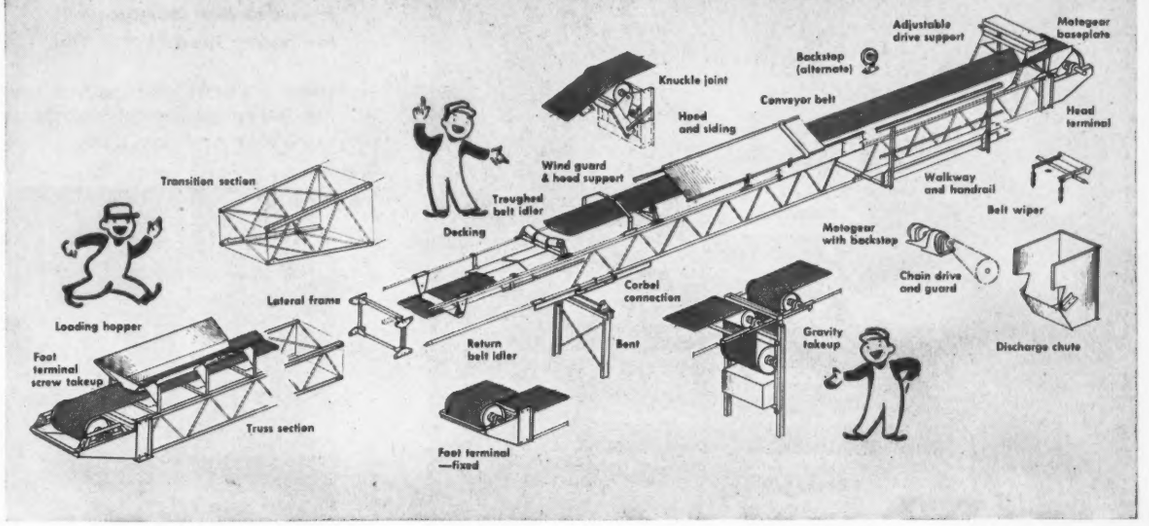


Aluminum sack-loader . . .

. . . will load a box car in less than an hour, one man managing entire operation. Automatic reels take up or let out electric cables to gear-motor at front end of loader. Moving parts work on self-aligning ball bearings.

(Sack loader is manufactured by Ottumwa Box Car Loader Co., Dept. CP, Ottumwa, Iowa . . . or for more information check 1784 opposite last page.)

THESE STANDARD COMPONENTS ARE ALL AVAILABLE TO MEET YOUR INDIVIDUAL REQUIREMENTS



NOW! The advantages of engineered belt conveyors in a LINK-BELT

PRE-BILT PACKAGE

easy selection

Your Link-Belt representative will help you select the best combination of PRE-BILT sectional belt conveyor components.

Standard 18, 24, 30 and 36-inch widths need no special engineering

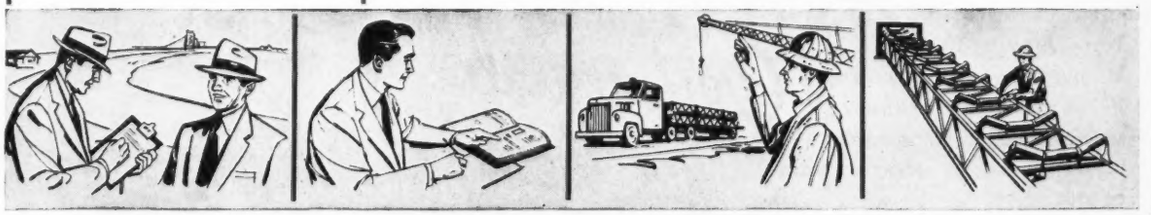
Here's an economical, standardized belt conveyor "package" . . . ready to meet the majority of belt conveyor needs and perform dependably for years and years. It combines standard Link-Belt products with sectional truss frames and steel supporting bents.

Book 2579 has further data on Link-Belt PRE-BILT conveyors . . . with drives up to 40 hp and 24 and 42-inch truss depths. Write today, or ask for a copy at your nearest Link-Belt office.

LINK-BELT

14.114

BELT CONVEYOR EQUIPMENT



prompt quotations

He will prepare a comprehensive and accurate estimate of requirements for installations that permit "on-the-ground" survey.

simplified purchase

Parts are standardized, interchangeable, all available from one supplier. Link-Belt representative can furnish all data.

quick delivery

PRE-BILT conveyors are built at nine strategic locations throughout the country and are shipped from the plant nearest you.

fast installation

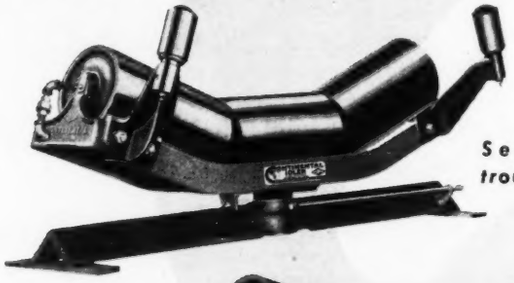
Can be readily handled by your own erectors in most cases. Link-Belt can also furnish complete erection service and supervision.

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

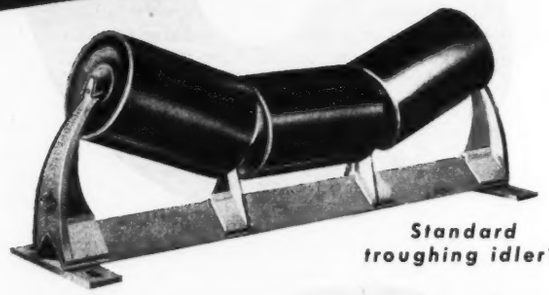
When inquiring check 1785 opposite last page

What do you need in IDLERS?

Unit stand with return idler and tripper rail?



Self-aligning troughing idler?



Standard troughing idler?

Now shipping from stock in Birmingham — all conveyor accessories and standard units. Consult us on "specials" — see our nearest office.

CG-5702

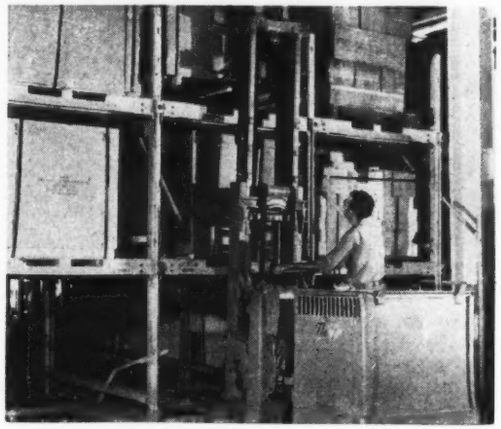
Continental has them!

INDUSTRIAL DIVISION
CONTINENTAL GIN COMPANY
BIRMINGHAM, ALABAMA
CGC ATLANTA CLEVELAND DALLAS KNOXVILLE MEMPHIS MOBILE NEW YORK 17

When inquiring check 1786 opposite last page

Provides live storage for heavy loads

Uses: Racks give quick-reference organization, first-in-first-out control, and short-term storage for extra-large or heavy loads.



Features: Wide variety of light- and heavy-duty rollers to fit job exactly.

Description: Roller capacity is 8000 lb. Loads move through rack lanes by gravity, are slowed by automatic brakes and hand-operated stops.

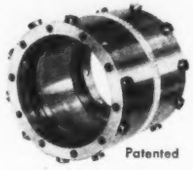
(A-F heavy-duty racks are manufactured by The Alvey-Ferguson Company, Dept. CP, North and Disney Sts., Cincinnati 9, Ohio . . . or for more information check 1787 on form opp. last page.)

"Where did you say you worked before you came with us?"

Cartoonist Al Suckar works at the Bayway Refinery, Esso Standard Oil Company, Linden, N. J.

Safer...Quicker Pipeline Repairs

WELD + ENDS Permits Welding a Pipeline While Pumping Through It



Patented

A pipeline safety welding coupling for crude oil, gas, gasoline, asphalt, steam, chemical process and other pipelines. WELD + ENDS joins pipe securely so flow can be resumed immediately at full pressure. Welding can be performed while pipeline is in use days or weeks later. Sizes 2″ to 36″.

• • •

Smith + Clamp Permits Plugging and Welding Pit-Hole Leaks in a Pipeline While Pumping Through It

Smith + Clamp shuts off more easily, quickly and safely than ordinary clamps. Use on high and low pressure gas, gasoline, crude oil, water, steam, air, chemical process and other pipelines. Sizes 1″ to 30″. Combine with WELDPLATE when pipe reinforcement is specified.

Write today for complete information on these latest developments in safer, quicker pipeline repairs: Weld + Ends and Smith + Clamp. Address Dept. A16

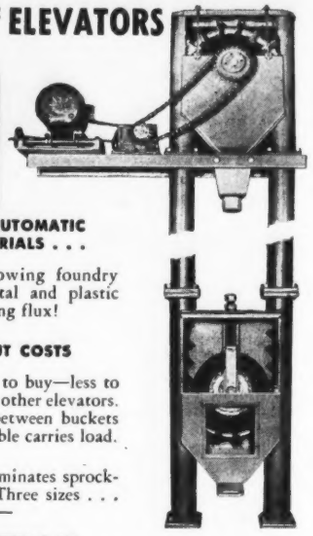
THE PIPE LINE DEVELOPMENT CO.
5700 DETROIT AVE., CLEVELAND 2, OHIO

When inquiring check 1788 opposite last page

NOW! Hapman HI-LIFT CABLE-VEYOR* ELEVATORS

offer a new

LIFT FOR YOUR PROFITS



. . . NEW ECONOMY IN AUTOMATIC HANDLING OF BULK MATERIALS . . .

Ideal for elevating free-flowing foundry sand, chemicals, foods, metal and plastic powders, gravel, coal, welding flux!

NEW DESIGN FEATURES CUT COSTS

Hi-Lift simplicity costs less to buy—less to operate. Far fewer parts than other elevators. No rivets, bolts, fasteners between buckets—long-lived flexible steel cable carries load. No chains!

Simple rubber-tired drive eliminates sprockets. Various bucket styles. Three sizes . . . two speed ranges. *Investigate—*

WRITE TODAY FOR BULLETIN C-27

*Trade Mark Reg.

Hapman CONVEYORS, INC.

DIVISION HAPMAN-DUTTON COMPANY

KALAMAZOO MICHIGAN

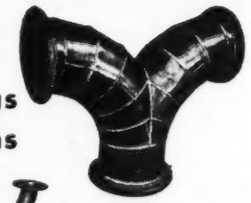
In British Commonwealth & Europe: Fisher and Ludlow Ltd., Birmingham

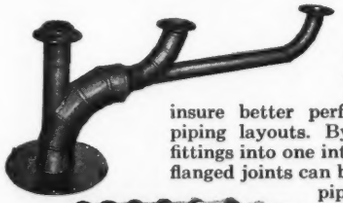
When inquiring check 1789 opposite last page

Need PIPE FABRICATIONS?

Let **NAYLOR**

Help You Save on Special Fittings and Fabrications





Naylor fabrication service can help you save money and insure better performance from your piping layouts. By combining several fittings into one integral unit, numerous flanged joints can be eliminated. Naylor pipe sizes range in diameter from 4" to 30" with all types of fittings and connections. Both pipe and fittings are available in steel, alloys and stainless steel.

Send specifications for quotation.

NAYLOR PIPE COMPANY

1260 East 92nd St., Chicago 19, Illinois

Eastern U.S. and Foreign Sales Office: 350 Madison Ave., New York 17, N.Y.

When inquiring check 1790 opposite last page

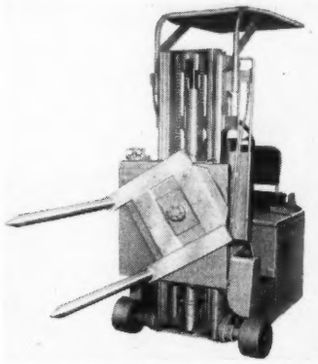
MATERIAL HANDLING

Picks up and dumps box left or right

Uses: For handling pallets or skid boxes.

Features: 360° rotating forks enable operator to pick up box and rotate it in either direction.

Description: Capacity of truck with attachment is 1500 lb at 36" load length. Attachment is equipped with round 2½"-diameter forks having a lowered height of 3¼" to permit normal handling. Rotation is accomplished by hydraulic motor operated from central hydraulic system. Controls for lift and tilt are foot-operated. Fork-rotating control is located beside driver's seat.



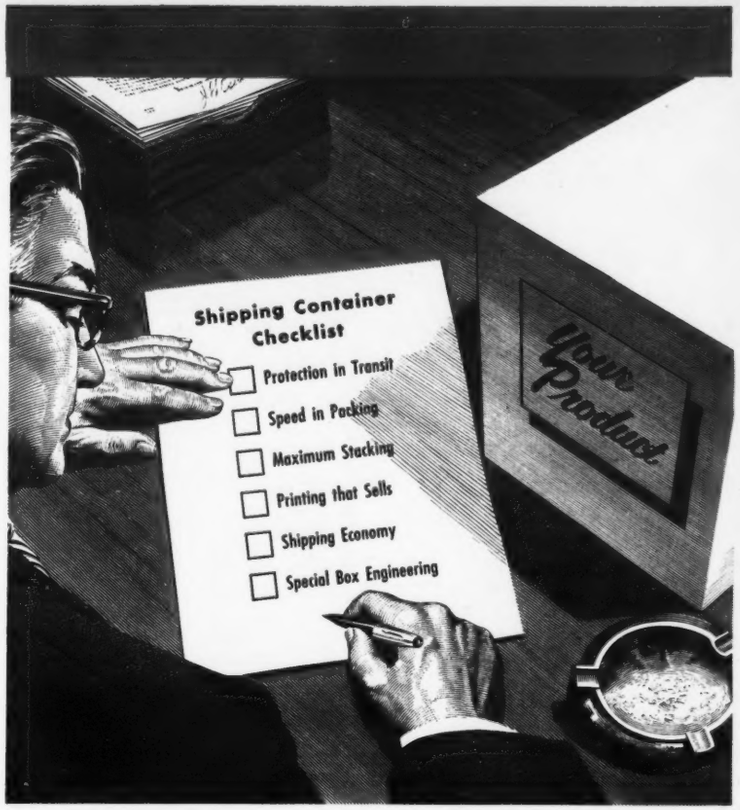
Truck with rotating forks has lift height of 106"

(Electric fork truck Model JFTT is manufactured by Lewis-Shepard Products, Inc., Dept. CP, Watertown, Mass. Check 1791 opposite last page.)

Describes bagging scale for fertilizer

High-speed automatic fertilizer bagging scale, capable of filling up to 24 sacks per minute, is described and illustrated in two-page, two-color data sheet. Dimensional drawing and table of key specifications are included.

Data sheet 5601 is issued by Richardson Scale Co., Dept. CP, Van Houten Ave., Clifton, N.J. Specify 1792 opposite last page.



CHECK THE FACTORS MOST VITAL TO YOU

Gaylord Boxes

SOLID FIBRE BOXES • FOLDING CARTONS
KRAFT PAPER AND SPECIALTIES
KRAFT BAGS AND SACKS

Whether you're President, Vice-President, Treasurer, Purchasing Agent, Sales Manager, Production Manager, Traffic Manager, Advertising Manager... the above factors in selecting the right shipping containers deserve your personal attention.

Call your nearby Gaylord packaging engineer for boxes made to your prescription.

GAYLORD CONTAINER CORPORATION • ST. LOUIS

DIVISION OF CROWN ZELLERBACH CORPORATION

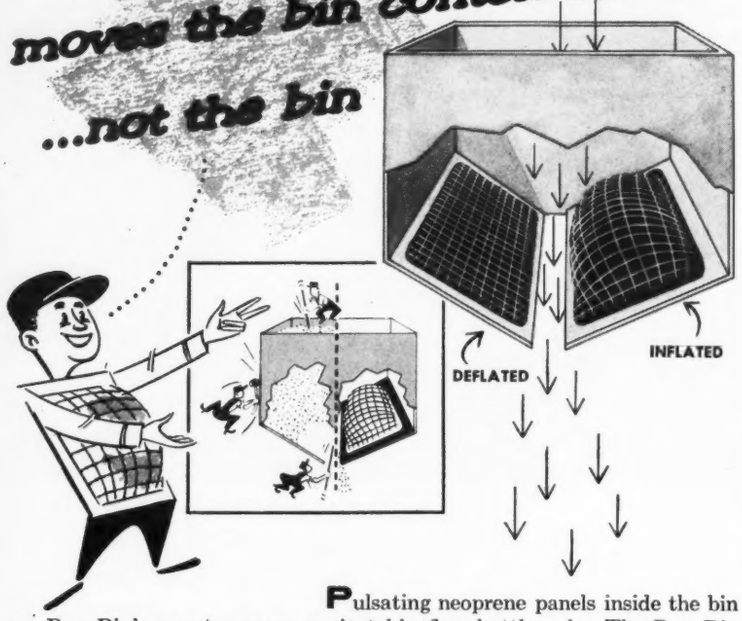
When inquiring check 1793 opposite last page

PneuBin's principle of

Positive Displacement

moves the bin contents

...not the bin



Pulsating neoprene panels inside the bin are PneuBin's secret weapon against bin flow bottlenecks. The PneuBin unit consists of steelbacked, neoprene, pulsating panels mounted on the inside wall of your present bins . . . and air controls to regulate the panels' action. By the pneumatic inflation and deflation of the PenuBin panels, the bin contents are positively displaced to insure free flow. After the panels have deflated, the air control unit (operating off the regular plant air supply) starts another cycle of inflation and deflation. The process continues *automatically* at whatever frequency is set on the air controller (this frequency is adjustable).

Because the neoprene diaphragm is resistant to oils and most chemicals and is also thick and tough enough to withstand severe abrasive service, PneuBin is applicable to most any bin flow problem.

Sizes: PneuBin panels are available in ten standard sizes from 4" x 12" to 24" x 72". Special sizes can be made if required in quantity.

Send for "Flow Stoppage Report" and free literature. PneuBin engineers will gladly make recommendations, with no obligation on your part.

GEROTOR

MAY CORPORATION

MANUFACTURERS OF— OWINGS MILLS, MARYLAND

Hydraulic Pumps and Motors

Variable Speed Hydraulic Transmissions

PneuBin—Pneumatic Bin Evacuators

When inquiring check 1794 opposite last page

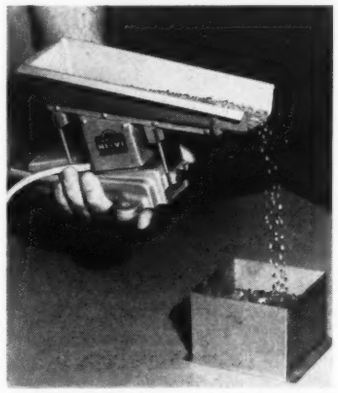
MATERIAL HANDLING

Handle small quantities with vibratory feeder

Uses: Handles material in quantities up to 500 lb per hour in such varied operations as feeding, bagging, adding reagents to chemical systems, and others.

Features: Unit operates directly off AC line, requires no source of rectified power.

Description: Feeder measures 10¾ x 5 x 6⅛" high, and weighs 7 lb. Flat, tubular, half-round, V-shape, and other tray shapes can be furnished. Unit consists of steel tray supported by cast aluminum member which incorporates a permanent magnet. Two laminated glass fiber springs join tray to base upon which an AC electromagnet is mounted.



Weighing only 7 lb, unit is designed for accurate feeding of small amounts of materials

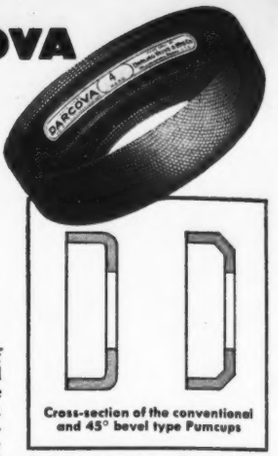
Entire drive system is provided with a protective cover. Rate of feed may be regulated by means of remote control which contains no rectifier. Controller is operated manually as a simple rheostat to vary voltage across the unit, causing immediate changes in feed rate. Rubber isolation mounts permit feeder to be put in operation quickly by placing it in desired position and plugging into standard 115v, 60-cycle AC line.

(Model FE ¼ vibratory feeder is product of Eriez Mfg. Co., Dept. CP, 1945 Grove Drive, Erie 9, Pa. . . . or for more information check 1795 on form opposite last page.)

TRY DARCOVA PUMCUPS

FOR

- *Higher pump efficiency*
- *Lower pump maintenance*



Cross-section of the conventional and 45° bevel type Pumcups

IT'S a fact that hundreds of reciprocating pump and cylinder users today are standardizing on Darcova Pumcups because they eliminate fluid slippage, costly down-time and maintenance!

It's easy to check these claims right in your own plant. Behind this exceptional Darcova Pumcup performance lies texture-engineering and cup design that conform precisely to pressure-temperature-fluid conditions.

Pumcups of various types are available in a complete range of sizes and texture-engineered compositions for your reciprocating pump and cylinder requirements.

Why not get *all* the facts? Send today for Pumcup Bulletin No. 5503.

DARLING VALVE & MANUFACTURING CO.
Williamsport 4, Pa.

DARCOVA — TRADE MARK — PUMCUPS

When inquiring check 1796 opposite last page

Lowest prices—highest quality on the market today, in STAINLESS STEEL PAILS

Welded 24 gauge		Welded heavy 20 gauge	
10 qt.	$ 9.25 ea.	10 qt.	$14.00 ea.
12 qt.	10.25 ea.	12 qt.	15.50 ea.
14 qt.	11.25 ea.	14 qt.	17.00 ea.
16 qt.	12.25 ea.	16 qt.	18.50 ea.
20 qt.	13.50 ea.	20 qt.	22.00 ea.
24 qt.	17.50 ea.	24 qt.	26.50 ea.
Discounts in quantity		Discounts in quantity	

Get all these durable, corrosion-resistant features

Entirely stainless (no solder)—smooth surfaces inside and outside—type 304 analysis stainless—improved shape for easier carrying, better balance—handles, ears, chimes of heavy-duty stainless—reinforced at all wear and stress points. Backed by Metalsmiths 30 years' service to textile industry.

Send your order today — prompt shipment

METALSMITHS

556 White St., Orange, N. J.

Specialists in Corrosion-Resisting Equipment

When inquiring check 1797 opposite last page

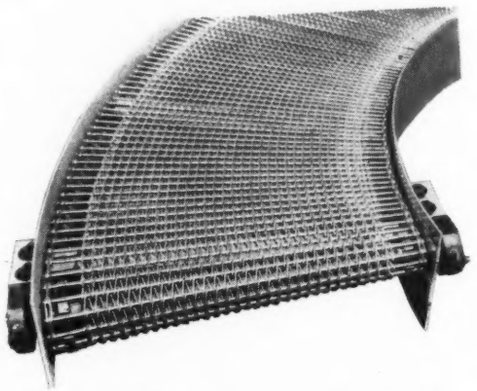
Nylon rails give longer life to conveyor turns . . .

special edge design prevents stretching and track-jumping on powered unit

Uses: Designed to move light or heavy loads around tight corners and from floor to floor, while maintaining product alignment.

Features: Nylon rails provide smoother, more quiet running, and assure longer equipment life. Special belt-edge design prevents stretching or track-jumping.

Description: Channel-weave mesh belt can be supplied in variety of steels and alloys, and in



Power turns with nylon rails run smoothly and quietly without complicated drive machinery

widths from 12 to 48". Units are available with 24 or 30" outside radius, in any degree of turn from 30 to 180°, and with fixed or variable speed, up to 100 fpm. Units can be floor-mounted or hung from ceiling.

(Meshlok conveyor power turns are manufactured by Voss Belting and Specialty Co., Dept. CP, 5645 N. Ravenswood Ave., Chicago 26, Ill. . . . or for more information check 1798 opposite last page.)

Mobile lift saves manpower, time, and money

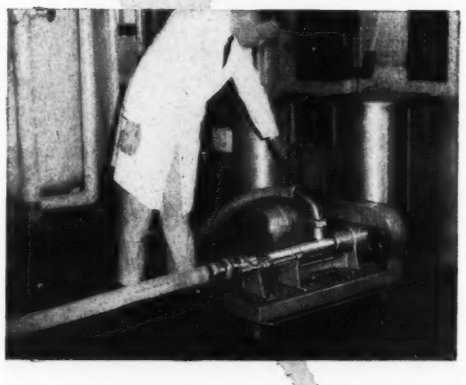
Mobile lifts of up to 2000-lb capacity, in both hand and battery-powered hydraulic models, are depicted in eight-page folder. Features of construction and operation providing savings in manpower, time, and money are pointed out. Table lists specifications for all models. Photographs show many uses of equipment.

List 55-L is issued by The Oster Manufacturing Company, Dept. CP, E. 289th St., Wickliffe (Cleveland 3.), Ohio. When inquiring specify 1799 on form opposite last page.

MOYNO® PUMPS

CUT HANDLING COSTS at Merck Sharp & Dohme, Division of Merck & Co., Inc.

...pumping mouthwash and general alkaline solutions



Moynos, with their "progressive cavity" pumping principle, provide a vital production lifeline at Merck Sharp & Dohme, Division of Merck & Co., Inc. They use Moynos to pump a variety of products, from water-like mouthwash to heavy pastes with viscosities up to 20,000 centipoise. The pump at the left, with a capacity of 30 GPM at 600 RPM, moves mouthwash and general alkaline solutions. Moynos have enabled thousands of plants to pipe different materials formerly moved by hand and other expensive means. They are the only pumps that will handle many difficult materials such as abrasives, pastes, slurries, chemicals, foods, suspended solids, etc., without foaming, aerating, crushing or excessive pump wear.

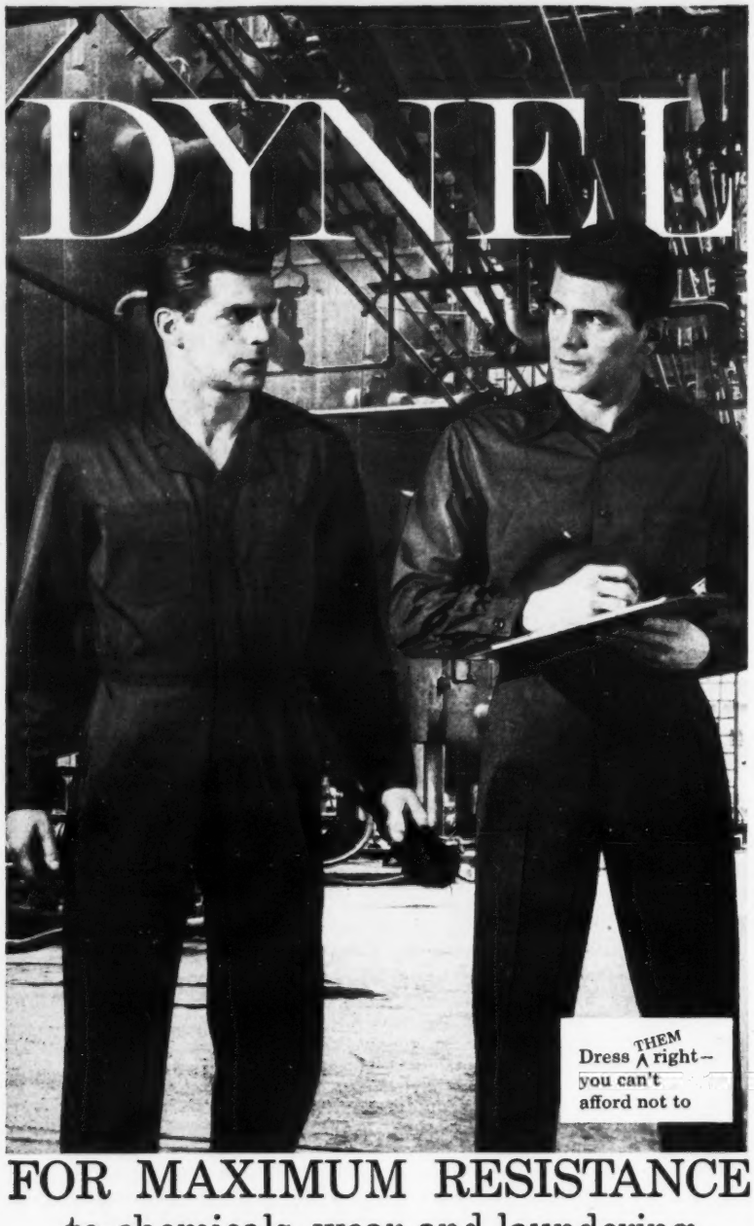
Examine your processing methods. No doubt there are several places where Moyno Pumps can drastically cut costs. Ask us. We'll give you a prompt answer. Send us an outline of your problem today! Write for Bulletin 30-CP.

ROBBINS & MYERS, INC.

SPRINGFIELD, OHIO | BRANTFORD, ONTARIO

Motors | Fans | Hoists | Moyno® Pumps | Propellair® (Industrial) Fans

When inquiring check 1800 opposite last page



FOR MAXIMUM RESISTANCE
to chemicals, wear and laundering
IN WORK CLOTHES

Wide use proves that work clothing made of DYNEL often lasts four or five times longer than comparable garments made with traditional fibers. DYNEL is unaffected by most chemicals; can be washed, dry cleaned or decontaminated in acids without harm; will not support combustion; retains strength wet or dry. Write for list of manufacturers.

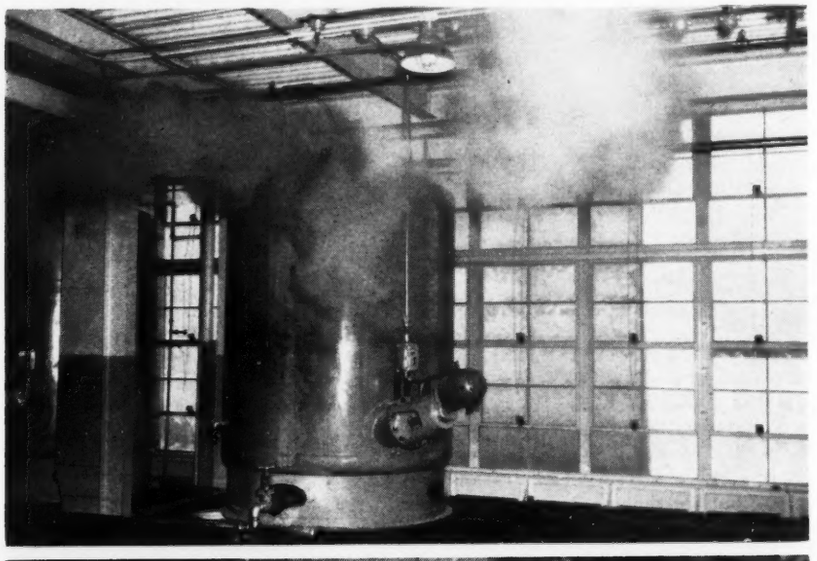
DYNEL • Union Carbide and Carbon Corporation UCC 30 East 42nd Street, New York 17, N. Y.

When inquiring check 1801 opposite last page

Johnson's Wax Company now relies on a central bulk-storage CO_2 fire extinguishing system to automatically . . .

protect all hazardous areas

Total room flooding (shown at early stage) is accomplished in around 1½ minutes



Hand-held units, having discharge range of up to 25 feet, can stop small fires before they can trip automatic equipment

reas and processes

Previous fire protection at S. C. Johnson & Son, Inc. Racine, Wisc., plant consisted of individual CO_2 cylinder systems of relatively small capacity located at various hazardous areas. Although adequate under normal circumstances, these systems had a number of drawbacks. First, they only had capacity for a single discharge, and no reserve supply of CO_2 was available to quench possible reflash of burning material.

Another major disadvantage was problem of recharging these cylinders. This often took as long as two days and all production work in an area had to be halted while system was replenished.

To eliminate downtime and provide more adequate protection, Johnson's installed system which provides automatic extinguishment for as many as twenty-five hazard areas. The single-unit, centrally-located CO_2 storage tank has capacity of six tons of liquid carbon dioxide under pressure of 300 psi, enough for a second shot even in the largest protected area involving total room flooding. Refrigeration unit holds liquid at a temperature of 0°F. Bulk truck replenishes CO_2 supply when necessary without any dismantling of system parts or any interruption of protection.

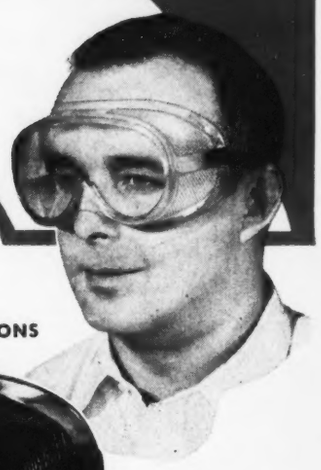
CO_2 is distributed to various hazards through fixed piping installation with pipe sizes from one to six inches. Flow of CO_2 is controlled by pressure operated valves, master valves in storage tank, and selector valves. Each control valve is actuated by pilot cabinet mechanisms which serve to supply pressure to main operating pistons for valve opening and closing.

Pilot mechanism is set into operation through thermal detectors, although each automatically protected area is also equipped with a push-button station for manual operations. Duration of discharge to a given hazard is controlled by an electrical timer and is usually set for about 1 to 1½ minutes. In this interval the CO_2 concentration reaches 40% by volume or higher.

Each hazard is provided with an alarm of suitable type arranged to sound for a predetermined interval of time before actual discharge, providing

(Please turn to next page)

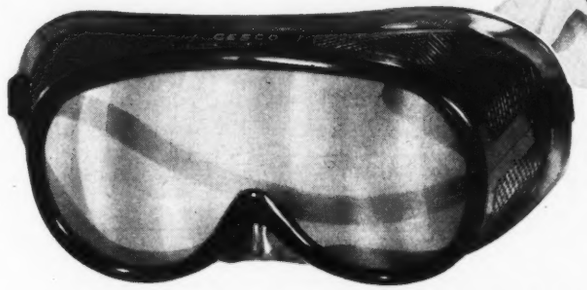
CESCO...RIGHT—BEFORE YOUR EYES!



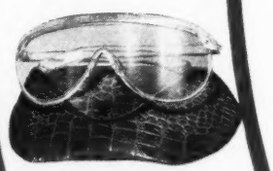
NEW! Flexible Plastic Goggles MEET WIDE RANGE OF INDUSTRIAL APPLICATIONS

CESCO No. 562 COVERLITE goggles

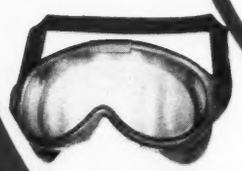
CESCO No. 255 LITE-KLIP safety spectacles



New CESCO No. 565 Flexible Plastic Goggles



CESCO No. 305 LITE-SPEC



CESCO No. 100 Chemical goggles

Extremely lightweight and durable—molded from soft vinyl material—these #565 CESCO Flexible Plastic Goggles protect workers from dust, splashing liquids and moderate impact from any direction.

Comfortable to wear • They are perfectly contoured and fit snugly all around. Small perforations, angled away from the eyes, give adequate ventilation.

Give complete protection • They leave no open spaces. Fit perfectly over most personal glasses.

Permit full view • Wide window lenses are curved rather than flat to allow best vision.

Available in two styles • No. 565C (with clear plastic lens) or No. 565G (with green plastic lens).

CHICAGO EYE SHIELD COMPANY • 2316 Warren Boulevard, Chicago 12, Illinois

OFFICES IN: Atlanta, Baton Rouge, Birmingham, Boston, Buffalo, Cincinnati, Cleveland, Columbus, Dallas, Denver, Detroit, Houston, Kansas City, Knoxville, Little Rock, Los Angeles, Louisville, Mexico City, D.F., Milwaukee, Montreal, Orange, Peoria, Philadelphia, Pittsburgh, Salt Lake City, San Mateo, Spokane, St. Louis, St. Paul, Toledo, Tulsa

ASK your CESCO Safety Equipment Distributor to show you this new goggle and the many other goggles in the complete CESCO line

CESCO CESCO FOR SAFETY

When inquiring check 1802 opposite last page

If There's a CORROSION PROBLEM *in Your Plant*

"RUBBERHIDE" LININGS *Offer the Reliable, Economical Solution . . .*

No matter what your corrosion problems may be, you can rely on Goodall engineering experience and technical skill to produce "RUBBERHIDE" Linings in specific compounds that will provide the satisfactory solutions. Compounded from rubber or neoprene to assure proper resistance to the particular corrosive agents involved, these modern Linings will repay many times their cost through extended life of the products, parts or equipment to which they have been applied . . . regardless of size, shape or service requirements.

"RUBBERHIDE" Linings are processed to objects shipped to our Linings Plants in Trenton, Chicago or Houston; or, when the objects are too large for such shipment, or the work involves fixed plant equipment, experienced field crews do the processing "on location". Whether factory or field processed, "RUBBERHIDE" Linings will assure effective, long-lasting protection.

* * *

Other Goodall corrosion control products include P.V.C. Linings, factory-applied in sheet form or by spraying; and "Allgood" Liquid Neoprene Coatings, in cans for brush-on application. **Contact our nearest Branch for details.**

Standard of Quality—Since 1870 HOSE · BELTING · FOOTWEAR · CLOTHING AND OTHER INDUSTRIAL RUBBER PRODUCTS

GOODALL *Rubber Company*

GENERAL OFFICES, MILLS and EXPORT DIVISION, TRENTON, N. J.
Branches and Distributors Throughout the United States and in Canada

When inquiring check 1803 opposite last page

Fire Extinguishing System

(*Continued from preceding page*)

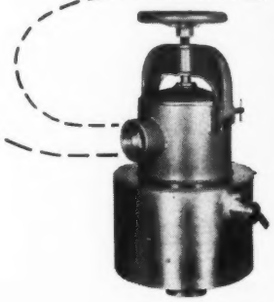
necessary advance warning to personnel. Open windows and doors around flooded areas are closed by gravity when holding mechanisms are released by pressure of discharged gas. Smallest hazard requires 300 pounds of CO_2 and the largest, a total room flooding operation, requires several thousand pounds.

To stop small fires before automatic system has a chance to go into operation, several CO_2 hose reel units are located throughout plant. Each reel is permanently mounted and contains up to 150 feet of 1 inch hose equipped with a squeeze-type valve, play pipe, and nozzle. Since each reel is connected by fixed piping to storage unit, supply is relatively inexhaustible. These hose units have an effective discharge range of about 25 feet ahead of the nozzle and a discharge rate of about 250 lb of CO_2 per minute.

(Cardox automatic fire protection system is product of Cardox Corp., Dept. CP, Old Republic Building, Chicago 1, Illinois . . . or for more information check 1804 on form opposite last page.)

Credit this cartoon to J. W. Hambleton, Devoe & Raynolds Co., Inc., Alhambra, Calif.

If you can't take the risk of product contamination by iron particles



FERRO FILTER®

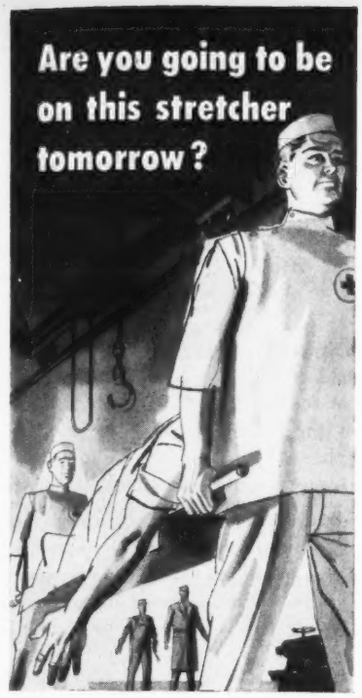
Electromagnetic Separators
will remove that risk . . . permanently

WET FERROFILTERS	DRY FERROFILTERS
For liquids and slurries of all viscosities. Three types — Gravity, Pipeline (shown) and Underfeed. Various sizes and capacities, to 3" pipe.	For powdered and granular materials. Two sizes. Handle up to 25 tons per hour depending on moisture content, fineness, specific gravity etc.

For full information Send for BULLETIN 16-E

S. G. FRANTZ CO., Inc.
Brunswick Pike & Kline Ave.
P. O. Box 1138 Trenton 6, N. J.

When inquiring check 1805 opposite last page



We think it is smarter to play safe all the time Observe every safety rule and use

Swagelok® FITTINGS

GET ALL THE FACTS: Write for the Swagelok catalog. Address Dept. C2

CRAWFORD FITTING CO.
884 EAST 140th STREET
CLEVELAND 10, OHIO

When inquiring check 1806 opposite last page

Blanket of spheres smothers fumes

About 55 hollow spheres are required to cover a square foot of tank surface

Uses: To control escape of acid fumes and minimize splashing in metal-plating and other industries.

Features: Molded of Bakelite polyethylene, spheres resist the acid solutions they float on.

Description: The hollow spheres measure about 1½ inches in diameter. This size was selected so that the spheres would be large enough not to lodge in recesses of the tanks. Nor are they so large as to leave much space between them when tightly packed. Approximately 55 spheres are needed to cover a square foot. A more uniform temperature in the plating bath is maintained through utilization of the spheres.

Polyethylene spheres blanket metal plating bath and control escape of acid fumes

Beside their resistance to strong acids, the spheres have the features of being lightweight, strong, and flexible over wide range of temperature.

(Go-Mist plating tank balls are manufactured by Cosom Industries, Inc., Dept. CP, 6012 Wayzata Blvd., Minneapolis 16, Minn. . . . or for more information check 1807 on form which is located opposite last page.)

NEVER UNDERESTIMATE THE DANGER OF FLAMMABLES!

DISASTER! "OPERATION FLAMMABLES"

Why flirt with disaster by using "make-shift" open containers for flammable solvents when fire-safe, protected dispensers are available for every flammable liquid use in all production processes throughout your plant—recommended and approved by Underwriters' Laboratories, Inc. and Associated Factory Mutual Insurance Companies.*

Far from interfering with production, many of these specially designed fire-preventive containers actually speed production, control ignitible vapors, avoid spillage and save worker time.

Learn more about the approved safety equipment you can use to protect your plant! Check the coupon for the free flammable liquid safety guides you require, or write direct to our Technical Services Department for assistance on special designs and individual applications.

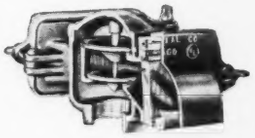
Fire Engineering Services. Protectoseal maintains a national field organization of experienced Safety Engineers qualified to detect flammable liquid hazards in all phases of plant operation and make practical, usable recommendations to eliminate them. A specialized engineering staff is also available to develop fire preventive flammable equipment to meet individual needs.

*Working to prevent fires in cooperation with Underwriters' Laboratories, Inc., Associated Factory Mutual Fire Insurance Companies, National Fire Protection Association, Factory Insurance Association, Improved Risk Mutuals.

Examples of a Wide Range of Protectoseal Products for Flammables Operations:

Storage and Dispensing Container

Drum Transfer Pumps



Storage Tank Vents

PROTECTOSEAL

West Coast Warehouse: Los Angeles, California
• In Canada: Safety Supply Co., Toronto

THE PROTECTOSEAL COMPANY, Technical Service Department
1932 South Western Avenue, Chicago 8, Illinois

Please send the following flammable safety guides with Price Lists, and the Safety Bulletin series as checked below:

☐ Safety Can Catalog ☐ Drum Storage and Dispensing Catalog ☐ Vent and Fitting Storage Tank Catalog ☐ Safety Bulletin Series on "Flammable Liquids, their characteristics, hazards and safe handling"

Name_____ Title_____

Company_____

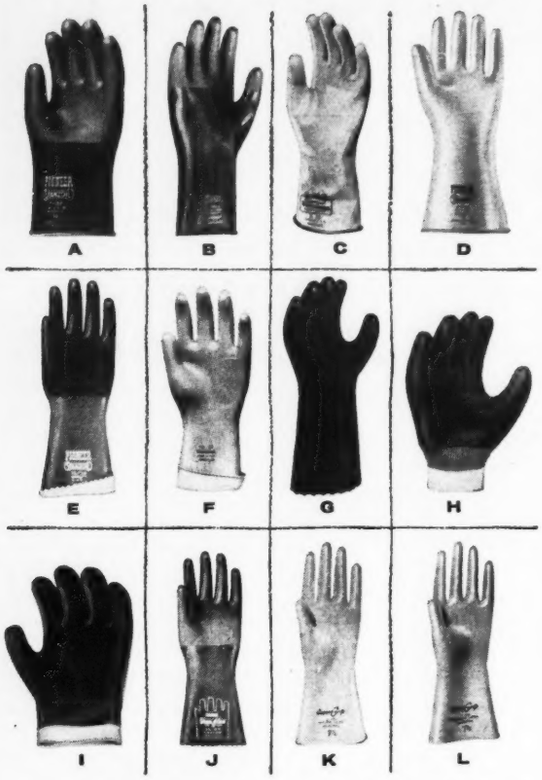
Address_____

City_____ Zone_____ State_____

When inquiring check 1808 opposite last page

Select The Right Glove...from

PIONEER's Super-Market of Hand Protection



A Stanzoil Black All Neoprene . . . . . 7 sizes, 5 lengths, 3 weights
B Stanzoil Red All Neoprene . . . . 3 sizes, 10½" length, sheer wt.
C Whitecap White All Neoprene. . . . 3 sizes, 10½" length, light wt.
D Stanzoil White All Neoprene . . . . . 7 sizes, 4 lengths, 3 weights
E Stanzoil Knit-Lined Neoprene . . . . 5 sizes, 3 lengths, 2 weights
F Stanzoil Flock-Lined Neoprene . . . 3 sizes, 10½" lengths, light wt.
G Pacemaker Black Neoprene Coated Flannel . 2 styles, 4 lgths., 2 wts.
H Pacemaker Red Neoprene Coated Flannel . 3 styles, 3 lgths. 2 wts.
I Stanflex Blue Plastic Coated Jersey . Full and Palm-Coat, 3 styles
J Stanflex Knit-Lined Red Plastic . 4 sizes, 11" length, medium wt.
K Sheergrip Natural Latex Rubber . . . 9 sizes, 3 lengths, sheer wt.
L Sheergrip Green Latex Neoprene . . 7 sizes, 10½" length, sheer wt.

Mail This Coupon Today!

The PIONEER Rubber Co.
241 Tiffin Road (Line)
Willard, Ohio, U.S.A.

Pioneers in Hand Protection — For Over 35 Years

Please send me:

☐ The name of my nearest PIONEER Glove Distributor.
☐ 1956-57 PIONEER Industrial Glove Catalog.
☐ Hand Protection Clinic glove recommendation for job described in enclosed letter.

Firm _____

Address _____

City _____ Zone ___ State _____

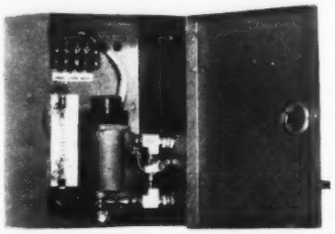
Signed _____

When inquiring check 1809 opposite last page

Samples atmosphere from remote locations

Uses: Sampler is designed as an accessory to manufacturer's combustible gas alarm, sampling atmosphere in areas of extreme temperature or inaccessible areas.

Features: Unit, mounted in non-hazardous location, draws continuous sample through copper tube from remote danger area.



Unit provides for attaching to vacuum source for forcing sample flow if necessary

Typical applications might include baking or drying operation, or engine-test room where extreme temperatures are found. Unit is also useful where excessive foreign matter is present in atmosphere, where gas is under slight pressure such as in tank or drum, or in an inaccessible area such as an underground tunnel, pit, etc.

Description: Outside fittings on sampler provide for connection of line to a vacuum source for forcing sample flow if necessary. Pump, driven by a ¼-hp motor, is offered as optional equipment. Unit includes flow meter and flow adjusting valve.

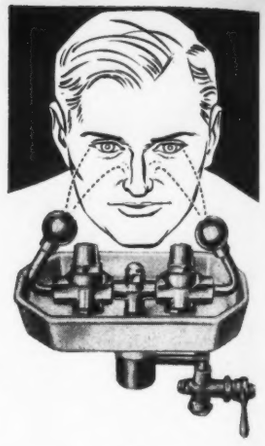
(Sampler accessory is manufactured by Johnson-Williams, Inc., Dept. CP, 2725 Park Blvd., Palo Alto, Calif. Check 1810.)

Mg-fire quenchers

A 149-page report, PB 121375, "A Study of Magnesium Fire Extinguishing Agents", may be obtained by remitting $3.75 direct to Office of Technical Services, US Department of Commerce, Washington 25, D.C.

the SAFE INVESTMENT

HAWS EYE-WASH FOUNTAINS



FIRST AID equipment for eyes is one of the best investments you can make! It minimizes costly insurance claims and thereby lowers your workman's compensation insurance rates—by reducing lost-time eye injuries.

Employees can cleanse injurious chemicals and particles from their eyes *instantaneously*—before the necessary medical aid can be reached. *HAWS Eye-Wash Fountains* and emergency drench showers are designed and manufactured in cooperation with leading Safety Engineers—they provide clear water at controlled pressure.

At a minimum investment, this valuable safety equipment practically pays for itself in reduced insurance rates. Write for full details TODAY!

HAWS DRINKING FAUCET CO.
1437 FOURTH STREET (Since 1909) BERKELEY 10, CALIFORNIA

When inquiring check 1811 opposite last page

SERVING INDUSTRY FOR 76 YEARS

Send Specifications for an estimate. Department 27

WIRE PRODUCTS Jelliff SINCE - 1680

THE C. O. JELLIFF MANUFACTURING CORP.
SOUTHPORT • CONNECTICUT • USA

When inquiring check 1812 opposite last page

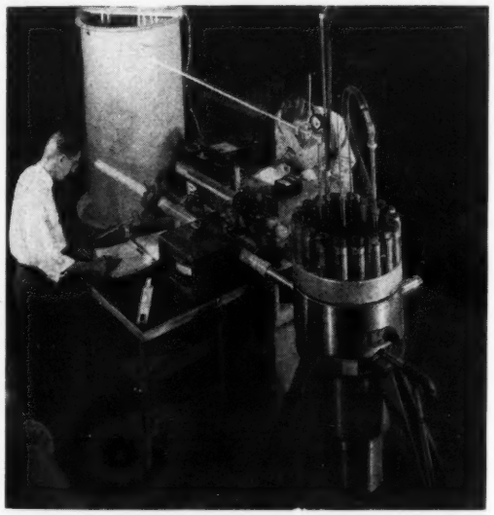
Toxic and dangerous gases moved without leakage . . .

centrifugal blower will handle 20 cfm of gas and operate at temperatures up to 500°F

Uses: Unit has application in any industry where corrosive, toxic, and radioactive gases at high temperatures and pressures must be moved without leakage.

Features: Blower will handle 20 cfm of gas having specific gravity of 6, and will develop 150-ft head in 2000-psi system. It is designed to operate at gas temperatures up to 500°F.

Description: Device consists of centrifugal blower and canned motor sealed in heavy stainless steel enclosure. Motor rotor and bearing components are located in lower portion of unit which



Blower is arranged so that all rotating and bearing parts come out easily after taking out threaded cover plug and seal weld

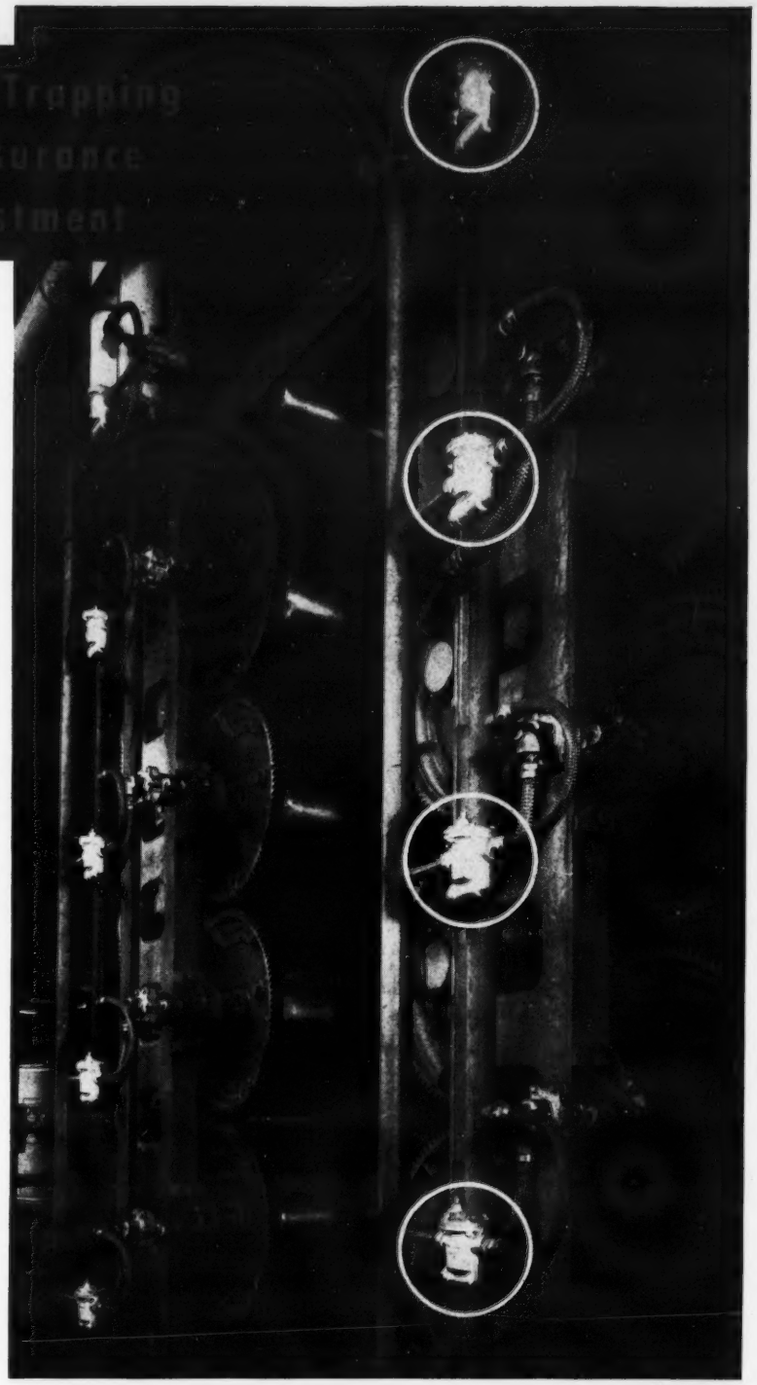
is filled with water. Cooling water is circulated through built-in coils, maintains temperatures of less than 210°F in rotor and bearing cavity. Fluid-piston radial and thrust bearings make leakproof design possible.

Auxiliary pump impeller mounted on main impeller shaft of blower pressurizes bearings. Contact between shaft and bearing occurs only during start-up or shut-down of blower.

Radioactive contamination and corrosiveness of water in rotor and bearing cavity is limited by labyrinth seals at water-gas interface. Water level is maintained by adding pure water at bottom of unit and tapping it below interface seal.

(Centrifugal blower is manufactured by Allis-Chalmers Manufacturing Company, Dept. CP, PO Box 512, Milwaukee 1, Wis. . . . or for more information check 1813 on form opposite last page.)

Armstrong Unit Trapping
—Low Cost Insurance
of a Big Investment



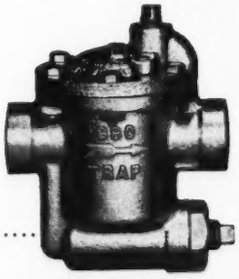
● *30% more production from kettles . . . 84 degrees higher dryer temperatures . . . 8% more output from dry kiln*—these are typical results of unit trapping with Armstrongs.

What about your plant? It doesn't make good business sense to spend $500, $5000 or $50,000 for equipment and then lose 10% to 30% or more of its productivity for lack of proper trapping.

Armstrong traps are "application engineered" by men who know trapping thoroughly—how to size traps for fast heat-up and top temperatures . . . correct installation practice . . . steam supply and return line requirements . . . variable pressure problems . . . mysterious difficulties. The cost of retrapping with Armstrongs is usually but a fraction of 1% of the cost of the equipment drained—*low cost insurance of a big investment!*

Call your Armstrong Representative today. He sells on a basis of "satisfaction or your money back." Or, write:

ARMSTRONG MACHINE WORKS
8801 Maple St., Three Rivers, Mich.



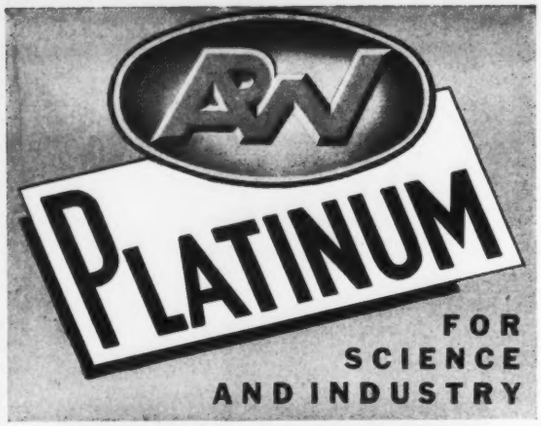
Armstrong built-in strainer traps, pictured on textile dry cans at the right, cost less to buy and install than standard traps and separate strainers—they reduce maintenance and costly shutdowns. Three sizes, ½" or ¾" connections.

SEND FOR FREE STEAM TRAP BOOK . . .

. . . 44 pages of how-to-do-it data. Useful and educational. Free on request without obligation.

ARMSTRONG STEAM TRAPS

When inquiring check 1814 opposite last page



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We pay highest prices for scrap platinum and also have facilities for prompt recovery of spent platinum and palladium catalysts

WE INVITE YOUR INQUIRIES. OUR FOLDER CP-20 "PLATINUM, GOLD AND SILVER FOR SCIENCE INDUSTRY AND THE ARTS" WILL BE SENT ON REQUEST.

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PRECIOUS METALS SINCE 1875
ENGELHARD INDUSTRIES

When inquiring check 1815 opposite last page

Cools twice the amount of wort —

Permits controlled air entrainment —

CUTS COSTLY MAINTENANCE

WILLIAM C. CLARKE, Assistant Editor

Problem: Cooling wort or unfermented beer at Theo. Hamm Brewing Company was a slow and difficult-to-control process. Baudelot (open) cooler installation permitted processing of only 300 barrels of wort an hour. Hamm's increased production rate required a considerably faster pace. In addition, accumulation of deposits on exposed cooler coils resulted in expensive cleaning labor (hand brushing). Six men required an entire working day to clean the cooler. Also, exposure of wort to room air caused problem of controlling sterile air and air entrainment into the wort.

In brewing, the important wort cooling takes place just before fermentation and shortly after wort has been boiled. Cooling not only serves to reduce temperatures but also to introduce air to activate yeast during fermentation.

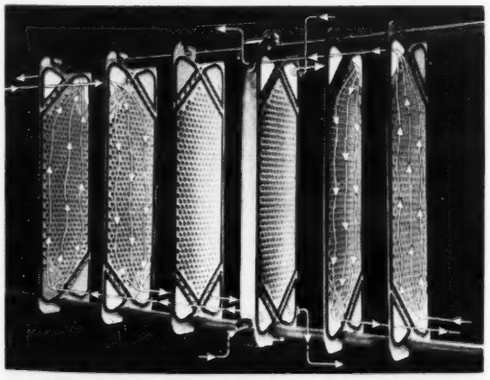
Solution: In 1953, a closed system for wort cooling was installed. Stainless steel plate cooler, occupying about the same floor space as the old unit, was chosen for the process.

Under the new system, cold well water is used to pre-cool the unfermented wort. (Water is then used as brewing water.) Propylene glycol is also used — as a secondary coolant — to help maintain required temperatures. At no time does wort come in contact with outside air. Water usage is minimized by design of plate cooler and heat transfer rate.

Each plate is stainless steel stamped out of one piece and having no welds or corners. Knob design creates a three dimensional turbulence and higher velocities. Exchanger design causes formation of wide, thin ribbon-like stream of wort, for intimate uniform heat transfer. Up to four different streams

(*Please turn to page* 164)

Five stainless steel heat exchangers cool wort at Hamm's Brewery — and improve fermentation control



Up to four different streams can enter and leave heat exchanger without danger of intermingling. Hamm's runs three streams through each unit — cold well water, propylene glycol solution, and hot wort, for cooling

the Sharples SUPER CLASSIFIER

Polyvinyl chloride . . . cement . . . barium sulphate . . . talc . . . sodium bicarbonate . . . ion exchange resins . . . zinc sulphide . . . iron oxide . . . flour . . . gypsum . . . uranium sandstone . . . fullers earth . . . these are but a few of the many dry powders which have been satisfactorily classified in the Sharples mill-size customer demonstration plant.

Now for the first time, there is available to industry a Super Classifier that provides ultra-sharp separations at high capacity, regardless of feed rate or size distribution in the feed—plus product recovery (yield) considerably higher than by any other means.

The Sharples customer demonstration plant is in all respects a full-scale commercial size classification plant capable of running continuously from 1,000 lbs. to 3,000 lbs. of product per hour. *Test results, therefore, are direct, require no extrapolation, and are precisely those obtainable from a Super Classifier of any capacity up to approx. 30,000 lbs. per hour.*

Sharples Bulletin 1280 will be sent upon request.

SHARPLES

THE SHARPLES CORPORATION
2300 WESTMORELAND STREET • PHILADELPHIA 40, PENNSYLVANIA
NEW YORK • PITTSBURGH • CLEVELAND • DETROIT • CHICAGO • NEW ORLEANS • SEATTLE • LOS ANGELES • SAN FRANCISCO • HOUSTON
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When inquiring check 1816 opposite last page

Wort Cooling

(*Continued from page* 162)

can enter and leave heat exchange without danger of intermingling. Heavy guide rails maintain alignment of plates. Each plate is electro-polished for cleaning ease. Cleaning solution is circulated by means of pump. Hand brushing is not required.

Air entering cooler is sterilized and filtered to prevent contamination. Air entrainment is controlled by cooler's automatic and recording air flow controller.

Results: Five plate coolers are installed in area formerly occupied by previous installation. Production is better than twice the old rate (665 barrels per hour against a previous rate of 300 barrels an hour). Maintenance has been reduced because hand brushing of cooling surface is no longer required. Instead of a six-man crew working one whole day, one man, in 1½ hours, runs cleaning solution through wort side after every fourth brew. Once a week, the cleaning solution is run through the water side. Also — air sterilization problem has been eliminated. Closed cooler permits controlled air entrainment for fermentation control.

(Superplate heat exchanger is product of Cherry-Burrell Corporation, Dept. CP, 427 W. Randolph St., Chicago 6, Illinois . . . or for more information check 1818 on form opposite last page.)

"Hello $C_{12}H_{22}O_{11}$ . . . What are you doing tonight?"

Cartoon by Ken Boyea, Hercules Powder Co., Holyoke, Mass.

Best way to solve your tube corrosion problems

What heat-exchanger tube alloy best meets *your* specific operating conditions? What effect will a change of alloy composition have on *your* operating and maintenance costs? Will future changes in operating schedules impair the efficient functioning of *your* tubes?

Best way to answer these and many other questions affecting your heat-exchanger tube selection is to ask Bridgeport. Our 60 years of tube manufacturing and corrosion research, backed by modern methods and facilities, have led to the development of a wide range of tube alloys to meet virtually every corrosion problem. Here are some of the standard tube alloys Bridgeport offers:

Admiralty—Good corrosion resistance to most types of circulating water at low velocities. Resists dezincification. Excellent corrosion resistance to clean fresh water and certain types of industrial and sewage pollution. A common choice for refinery heat exchangers where sulfides are present in petroleum streams.

Aluminum Brass—Excellent corrosion resistance to sea water. Resists impingement corrosion where water velocities are high. Excellent corrosion resistance to chlorinated sea water when chlorine is used for slime control. Excellent corrosion resistance to clean and polluted fresh water. Ideal for severe operating conditions.

Copper—Good general corrosion resistance. Good impingement corrosion resistance where water velocities are low. Immune to dezincification. Successfully handles esters, fluorides, oxygen, hydrogen, etc. Excellent heat-transfer rate. Widely used for heat exchangers, evaporators and condensers.

Cupro Nickel—Considered the best copper-base alloy for all-around corrosion resistance toward saline waters. Has unusually high strength at elevated temperatures.

Aluminum Bronze—Good general resistance to impingement and corrosion in brackish water and in areas where water is contaminated by acid wastes. Handles non-oxidizing salt solutions, glycols, esters, halogen derivatives, etc.

Red Brass—Good corrosion resistance in fresh water. Excellent resistance to dezincification. Satisfactorily handles chlorinated organic compounds.

Muntz Metal—Similar to Admiralty in resisting sulfur corrosion. Resists dezincification in sea water, brackish water and most fresh waters.

Duplex—The ideal answer to many dual corrosion problems. Widely used in exchangers handling hydrogen sulfides, chlorides, ammonia and various petroleum products. A range of over 101 combinations available for all refinery and chemical processes.

Bridgeport's Technical Service and Corrosion Laboratories are at your service to help you with specific problems. Call your nearest Bridgeport Sales Office for complete information.

The Bridgeport Condenser Tube Handbook *has 162 pages of valuable information on corrosion and how to combat it. Write for a copy.*

Bridgeport Brass Co.

BRIDGEPORT CONDENSER TUBES

Bridgeport Brass Company, Bridgeport 2, Conn. • Offices in Principal Cities
In Canada: Noranda Copper and Brass Limited, Montreal

When inquiring check 1817 opposite last page

Electric membrane method of demineralization

Bulletin of 20 pages describes basic principles of electric membrane method of demineralization. Design, performance, and cost data for various size units are provided. Units range in capacity from 2500 to two million gallons of demineralized water daily, using input water containing from 1000 to 10,000 ppm of total dissolved solids.

Bul 3 is issued by Ionics, Inc., Dept. CP, 152 Sixth St., Cambridge 42, Mass. When inquiring specify 1819 opp. last page.

Pulp filter has 9′ discs

Construction and operating features of filter with 9′ discs are covered in two-page bulletin. Drawing and chart give complete data on dimensions of filter. Bulletin tells how large volumes of pulp are efficiently filtered with significant savings in operation and maintenance.

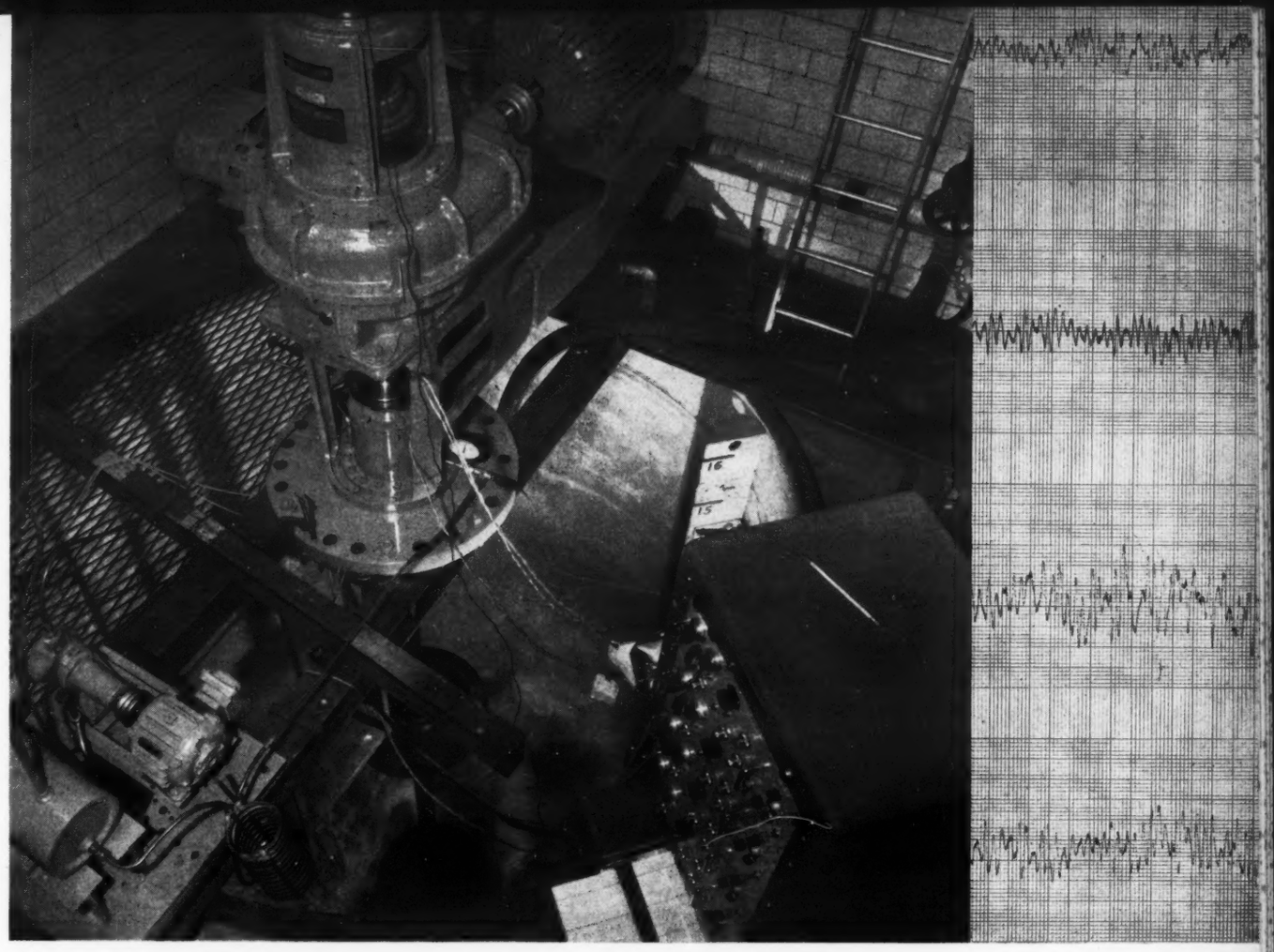
Bul F9-B4 is issued by Denver Equipment Company, Dept. CP, 1400 Seventeenth St., Denver 17, Colo. When inquiring specify 1820 opp. last page.

Hard-to-handle materials get good screening

Manufacturer's bulletin tells how severe bolting action gives satisfactory screening performance on difficult-to-handle materials. All details of construction and operation of centrifugal reel, as well as adaptability of equipment, are discussed.

Bul 76-A is issued by Sprout, Waldron & Co., Inc., Dept. CP, Muncy, Pa. When inquiring specify 1821 opp. last page.

For more information on product at right, specify 1822 . . . see information request blank opposite last page.



How this shaft deflection test

can give you **better fluid mixing**

Some secrets of efficient fluid mixing lie hidden beneath the tug-and-pull of fluids buffeting this LIGHTNIN Mixer's impeller.

These fluid forces are beginning to yield clues that can help you get improved mixer design and lower mixing costs.

Solving the seal dilemma

For example, if you're mixing fluids under pressure or vacuum, you probably want the great operating economy of a rotary mechanical seal.

You want the shaft diameter large enough to run with minimum deflection, to keep the sealing faces accurately aligned—but not larger than *really* necessary.

Seeing what deflection looks like

That is one reason why, as the 4-inch shaft on this 50-horsepower LIGHTNIN test unit revs up toward its natural vibration frequency, four MIXCO-designed strain-gage pickups start "taking the pulse" of the rotating shaft.

At the recorder, four electric styli trace a profile of the frequency and amplitude of shaft deflection during the run, in various liquid depths, and under different conditions of impeller size, location, and tank baffling. The data are accurate to 0.0005 in.

Combined with continuous torque measurements, this composite profile provides basic data for computing the stresses acting in the shaft.

Getting rid of a bearing

Efficient mixer shaft sealing is only one product of these test runs. They also permit highly accurate design of overhung shafts to operate without a steady bearing in the tank bottom, thus eliminating a major maintenance cost item.

This is one of the new directions MIXCO research is taking. Our research department welcomes the opportunity to cooperate with you in any phase of your work leading to more efficient fluid mixing.

Lightnin® *Mixers*

MIXCO fluid mixing specialists

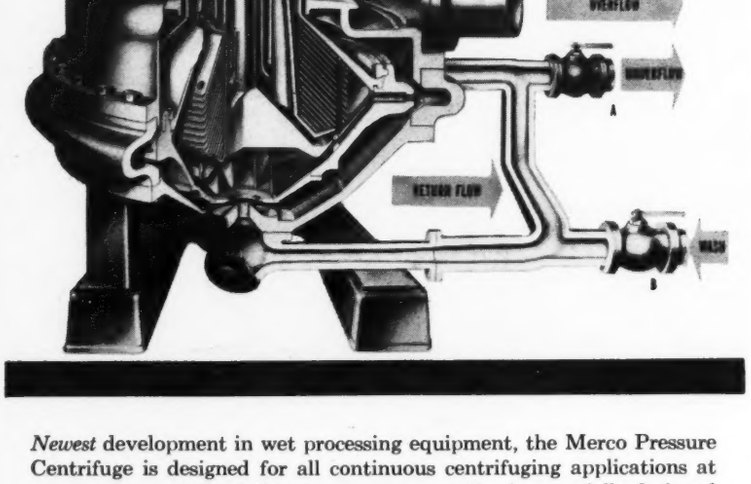
MIXING EQUIPMENT Co., Inc., 185-b Mt. Read Blvd., Rochester 11, N.Y.

In Canada: Greey Mixing Equipment, Ltd., 100 Miranda Ave., Toronto 10, Ont.

NOW

Centrifugal Separations under pressure conditions with the new

Merco Pressure Centrifuge



Illustrative drawing of Merco Pressure Centrifuge. In this example, wash is being introduced into recycle line at point B. If no wash is required, valve at B is closed. Concentrate is withdrawn at point A.

Newest development in wet processing equipment, the Merco Pressure Centrifuge is designed for all continuous centrifuging applications at pressures up to 110 psi. Key to pressure operation is a specially designed housing closure that has been exhaustively tested at pressures two to three times the guaranteed figure of 110 psi. Equally important, this new unit incorporates the unique Merco "Return Flow" principle for maximum operating flexibility. Under centrifugal forces thousands of times higher than gravity, even the smallest particles in the feed "sink" rapidly outward and are continuously expelled through fixed open nozzles in the rotor. A controlled portion is withdrawn as finished concentrate and the remainder becomes a return flow to the rotor. Wash, if desired, is introduced to the return flow line . . . clear, excess liquor overflows out the top of the unit.

If there's a step in your flowsheet involving concentration, washing, clarification, soluble recovery, or classification *under pressure*, there is a good chance that this new tool will prove useful. Bulletin No. 2600, just off the press, describes the Merco Pressure Centrifuge in detail. For your copy, write Dorr-Oliver Incorporated, Stamford, Conn.

Merco T.M. Reg. U. S. Pat. Off.

DORR-OLIVER
INCORPORATED
WORLD-WIDE RESEARCH • ENGINEERING • EQUIPMENT
STAMFORD • CONNECTICUT • U.S.A.

When inquiring check 1823 opposite last page

Removes 5-micron particles from liquids

Uses: Polishing alcohols, demineralized and deionized water, fine enamels, clear lacquers, pharmaceuticals, and similar solutions.

Features: Removes particles down to 5 microns (0.0002″). Handles high alkaline fluids without contamination of fluid or deterioration of filter cartridge.

Description: Filter cartridge is made of white cellulose, bonded with totally inert resin. Construction of filter enables larger particles to be trapped out early in flow path, preventing plugging of finer filter barriers.

(White Micro-Klean" 5-micron filter is product of The Cuno Engineering Corporation, Dept. CP, 80 S. Vine St., Meriden, Conn. Check 1824 opp. last page.)

How to cut production costs with drum rotators

Ways to reduce mixing, blending, tumbling, and cleansing costs are featured in illustrated two-page bulletin. Also described are portable and stationary drum rotators.

Bul 355 is issued by the Morse Manufacturing Company, Inc., Dept. CP, 727 West Manlius St., East Syracuse, N. Y. Specify 1825 opposite last page.

Wide variety of materials handled by crusher

Two-page bulletin describes horizontal (cylinder and nut-type) crusher. Unit is designed for crushing many different types of products. It will reduce lumps in a general range of 4″ to 5″ ring size. Extremely friable materials of 6″ to 8″ can also be handled.

Bul 129 is issued by Sprout, Waldron & Co., Inc., Dept. CP, Muncy, Pa. When inquiring specify 1826 opp. last page.

TRENT Engineering and Design Trouble-Proofs **IMMERSION and CIRCULATION HEATING UNITS!**

For Efficient Immersion Heating of

• *HOT WATER TANKS* • *WATER BATHS*
• *RINSES AND CLEANERS* • *GLUES AND OILS*

Rugged Trent Water Immersion Heaters are available in a complete range of types and sizes for heavy duty service up to 100 KW in single packaged unit.

Dependable, Trouble-Free Heating for

• *CIRCULATING OIL SYSTEMS*
• *ATOMIZATION* • *HEAT TRANSFER FLUIDS*
• *STORAGE TANK HEATERS*

Heavy duty Trent Oil Immersion Heating Units offer packaged unit design in a range of sizes for service up to 50 KW.

TRENT IMMERSION AND CIRCULATION HEATERS ARE UL AND CSA APPROVED

Let Trent's more than 25 years' manufacturing experience solve your heating problem. Discuss your application with a Trent representative today!

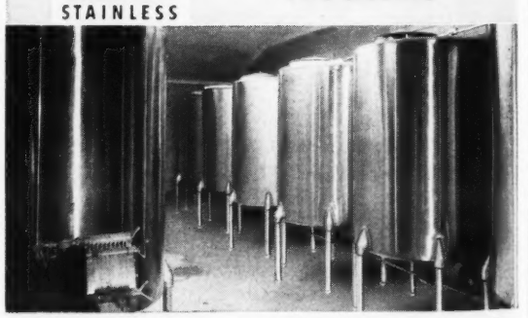
Trent Representatives in Principal Cities Coast to Coast

TRENT INC.
Electrically Heated Industrial Equipment
242 LEVERINGTON AVE., PHILA. 27, PA
In Canada Supreme Power Supplies Limited, Toronto 14

When inquiring check 1827 opposite last page

STAPCO STAINLESS

STAPCO TAILORED TANKS FOR PROFITABLE PROCESSING



STAPCO single shell storage and processing tanks are tailor made to your exact needs. Capacities range from 5 to 20,000 gallons; materials used may be stainless steel, monel, inconel, aluminum or any other special alloy. Tops may be open or closed; shells horizontal or vertical — agitators, valves and other required attachments may be located where the job dictates.

Built better to last longer, STAPCO tanks will serve you well and assure a more profitable operation.

A Complete Engineering Service . . .

STAINLESS PRODUCTS CORPORATION
BELDING, MICHIGAN

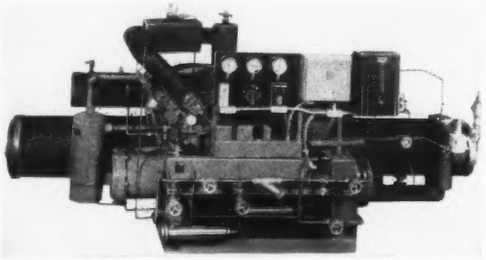
When inquiring check 1828 opposite last page

Packaged liquid cooling unit can be installed quickly . . .

units are ready for immediate operation

Uses: Units are designed for chilling liquid chemicals, and corrosive, fouling, viscous or slurry-type fluids.

Features: Coolers are shop-assembled and tested, ready for quick installation and immediate operation. Unit has high rate of heat transfer because most of refrigerant in shell is liquid instead of wet gas mixture with high gas content.



Cooling unit is shop-assembled and tested, ready to be installed and operated immediately

Description: Packaged unit includes compressor, motor and starter, refrigerant controls, liquid cooler, condenser, piping, wiring and insulation. Coolers are available in sizes from 5 to 100 hp. In units using fluorinated hydrocarbon refrigerants, shell is fabricated from steel pipe or rolled plate, with fixed tube sheets and removable heads, in conformance with ASME Code.

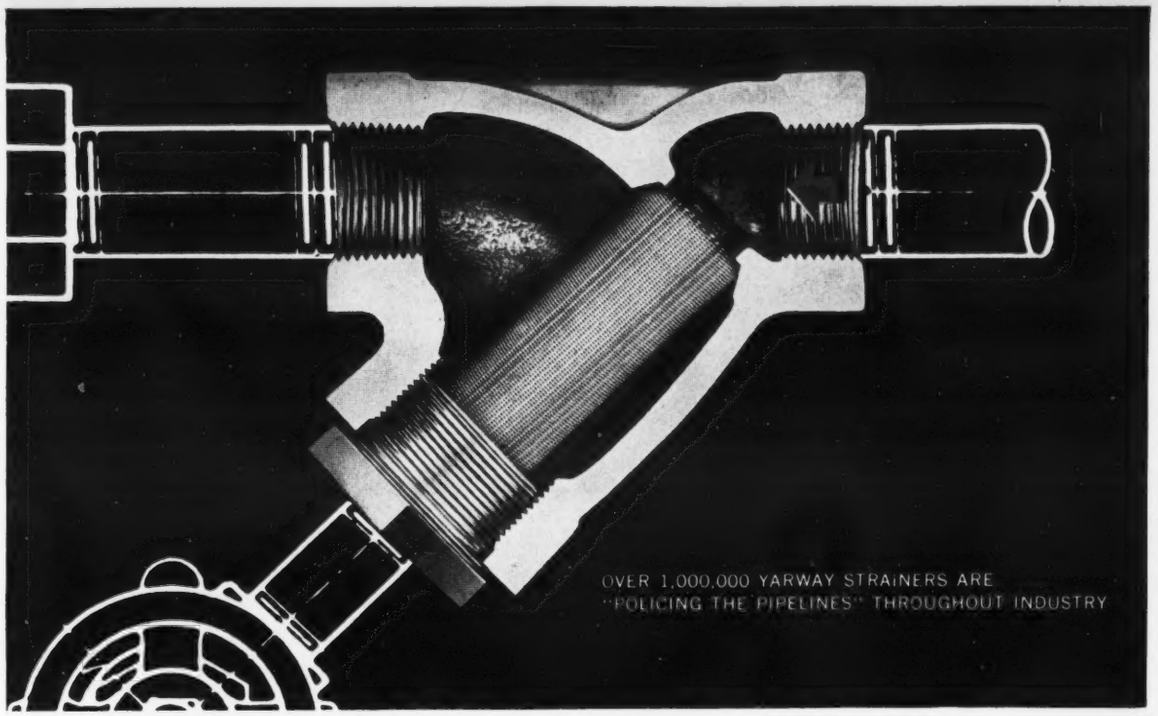
High heat transfer rates are obtained by controlling flow of fluid through a special multi-pass cooler. Design of cooler permits cleaning of tubes without breaking any connections in closed refrigeration circuit.

(Flooded-type liquid cooler is product of Doyle & Roth Manufacturing Co., Inc., Dept. CP, 136-50 Twenty-fourth St., Brooklyn 32, N.Y. . . . or for more information check 1829 opposite last page.)

Capacity tables for condensers aid size determination

Complete line of manufacturer's series of steam-to-water condenser is covered in 12-page bulletin. Capacity tables are arranged to allow quick determination of condenser size. Bulletin includes step-by-step method devised to simplify converter selection. Converters for radiant heating applications are listed separately.

Bul 50 is issued by Davis Engineering Corporation, Dept. CP, 1064 E. Grand St., Elizabeth, N. J. Specify 1830 opposite last page.



it's GOOD ENGINEERING to install YARWAY STRAINERS

It's good pipeline engineering to install strainers that are well-engineered—Yarways.

Yarway Fine Screen Strainers protect equipment, prevent dirt, scale, chips, welding dross, etc. from reaching working parts.

Yarway Strainers feature Dutch weave Monel woven wire screens with high mechanical strength and extra fine straining service. Perforated screens in Monel, stainless steel or brass are also available for certain services.

Screen is easily removed for cleaning. Unscrew screen cap and screen comes out with it. When replacing screen, straight threads assure correct alignment, no distortion of screen.

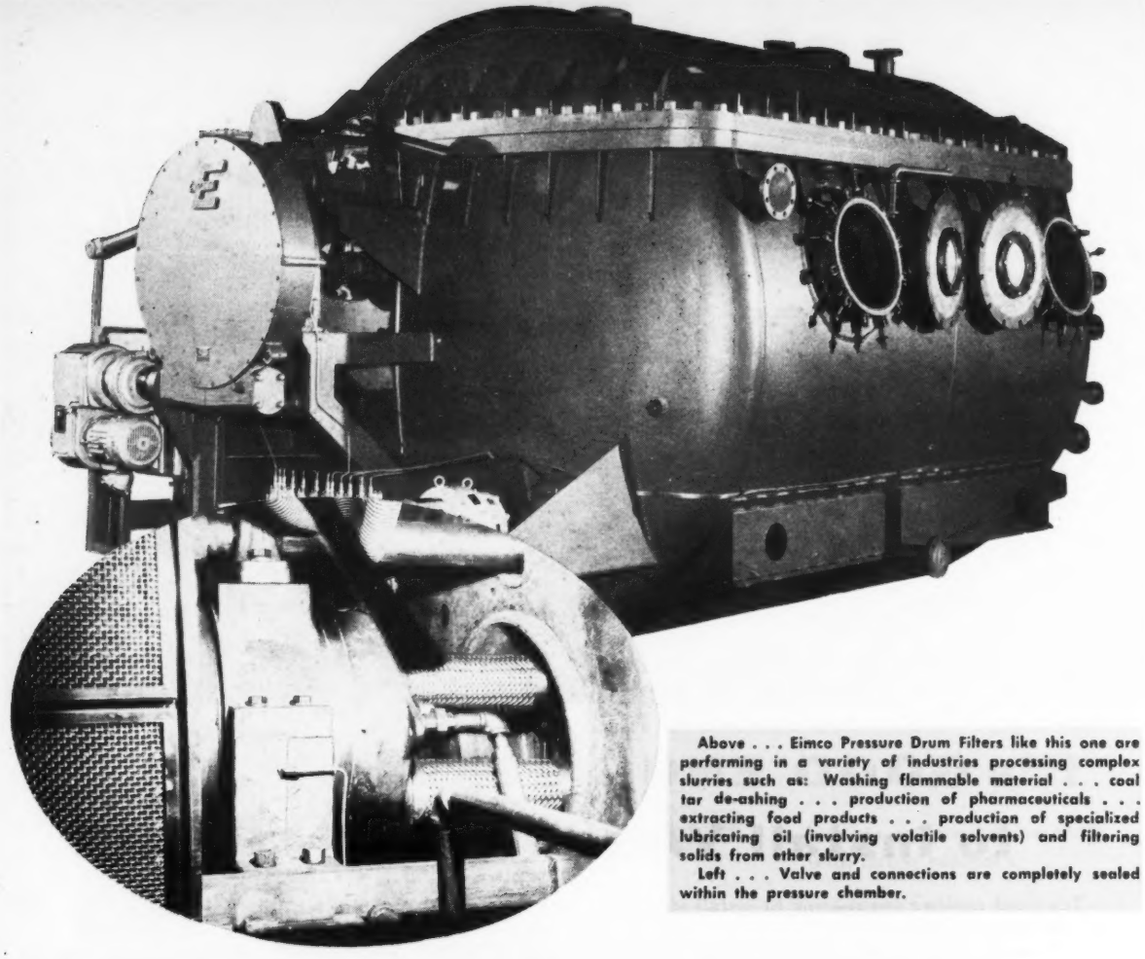
Yarway Strainers are made in iron or steel with rust-resistant finish—also in bronze, stainless steel or aluminum. 10 standard sizes from ½" to 3". Larger sizes to order. Nearly 300 Industrial Distributors stock and sell Yarway Strainers. For the name of the one nearest you, and Yarway Strainer Bulletin S-204, write

YARNALL-WARING COMPANY
125 Mermaid Avenue, Philadelphia 18, Penna.

Standard Yarway Strainer, screwed connections
Flanged Yarway Strainer with 2-bolt blow-off cover
Flanged Yarway Strainer with 4-bolt blow-off cover
Dutch-weave Monel woven wire screen
Perforated Screen

YARWAY FINE SCREEN STRAINERS

When inquiring check 1831 opposite last page



Above . . . Eimco Pressure Drum Filters like this one are performing in a variety of industries processing complex slurries such as: Washing flammable material . . . coal tar de-ashing . . . production of pharmaceuticals . . . extracting food products . . . production of specialized lubricating oil (involving volatile solvents) and filtering solids from ether slurry.

Left . . . Valve and connections are completely sealed within the pressure chamber.

Here Are 5 Major Process Conditions...

where correct application of Eimco Pressure Filters will get you appreciable advantages:

(1) Where vapor pressure of the liquid at the filter feed temperature is too high to permit the efficient use of vacuum . . . **(2)** Where liquid viscosity is high (generally 100 centipoises or more) or solid particle size is very small, requiring a driving force greater than one atmosphere to get economic filtration rates . . **(3)** Where large labor savings and lower operating costs justify higher initial expenses . . . **(4)** Where employment of a valuable or high temperature gas for the production of a dried cake product is feasible . . . **(5)** Where filtration of saturated solutions results in excessive crystallization with a reduction in temperature or pressure.

Whether you are pre-planning for filter installations to handle new processes or are seeking to improve present operations . . . these are some of the general conditions that justify an investigation into **Eimco Continuous Pressure Filter Equipment.**

Submit your problem to the Eimco Research and Development Center, Palatine, Illinois. They have complete facilities to test your slurry on all types of filtration equipment to assist you in selection of a proper unit.

After exhaustive tests, if research shows that pressure filtration can be correctly applied to your problem, you will find that Eimco Pressure Filters offer you production (and profit) advantages.

Whatever your filtration problem, let Eimco's competent research facilities go to work for you. Write today!

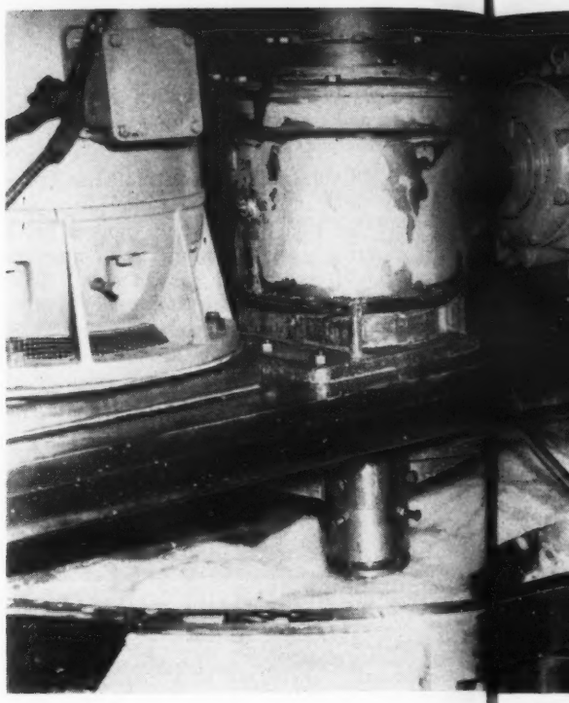
THE EIMCO CORPORATION

SALT LAKE CITY, UTAH

Research and Development Division, Palatine, Illinois • Process Engineers Inc. Division, San Mateo, California
Export Offices: Eimco Building, 51-52 South Street, New York 5, N. Y.
BRANCHES AND DEALERS IN PRINCIPAL CITIES THROUGHOUT THE WORLD

B-237

When inquiring check 1832 opposite last page



Combination paddle mixer-homogenizer with double mixing action . . .

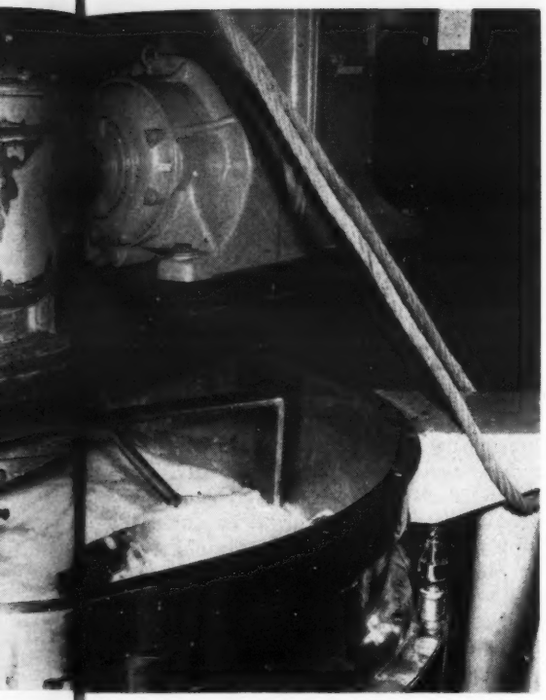
blends — then homogenizes or emulsifies in one step

Uses: Blending, homogenizing, or emulsifying slurries, pigmented coatings, resinous compounds, and similar heavy, viscous materials.

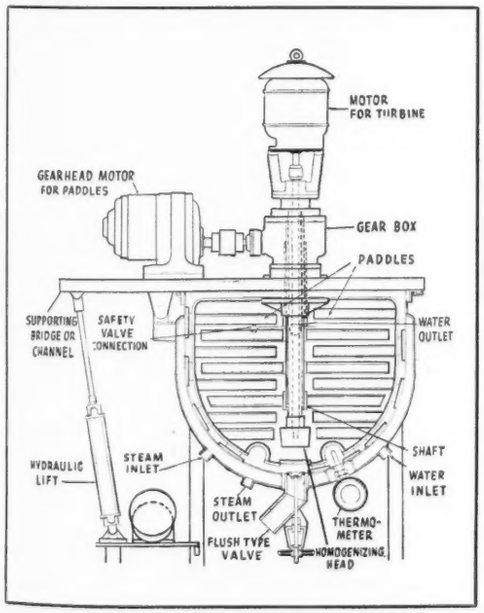
Features: Unit is a combination mixer and homogenizer capable of handling materials with a viscosity range of about one to 40,000 cp. Double mixing action permits products to be blended and homogenized at the same time, with mixing rates reported up to 10 times faster than conventional equipment. Paddle mixer and homogenizer may be operated simultaneously or independently of each other.

Description: The Agi-Mixer consists of a set of counter-current-motion, horizontally rotating paddles fitted with bayonet-type, floor scraper blades operating in conjunction with a high-speed homogenizer. Paddles work material down into the

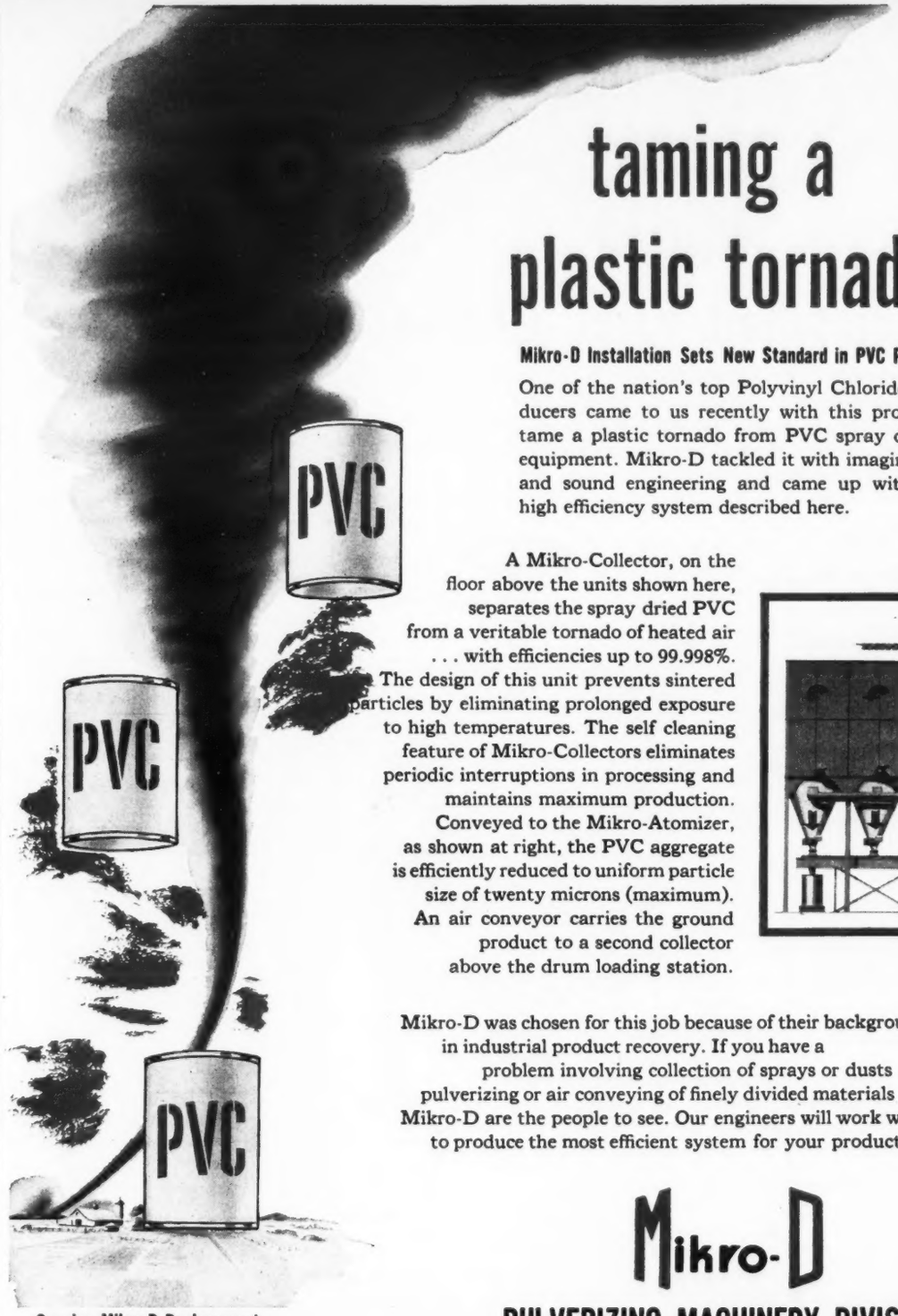
(Please turn to page 170)



Mixers are available in laboratory and production models ranging in capacity from 3 to 1000 gal



Homogenizing head, run by separate motor, is at bottom of mixer. Mixing elements can be tilted out of kettle by means of hydraulic lift

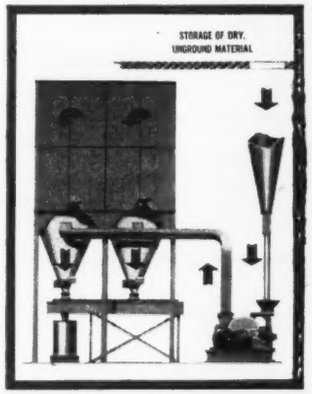


taming a plastic tornado!

Mikro-D Installation Sets New Standard in PVC Process

One of the nation's top Polyvinyl Chloride producers came to us recently with this problem: tame a plastic tornado from PVC spray drying equipment. Mikro-D tackled it with imagination and sound engineering and came up with the high efficiency system described here.

A Mikro-Collector, on the floor above the units shown here, separates the spray dried PVC from a veritable tornado of heated air . . . with efficiencies up to 99.998%. The design of this unit prevents sintered particles by eliminating prolonged exposure to high temperatures. The self cleaning feature of Mikro-Collectors eliminates periodic interruptions in processing and maintains maximum production. Conveyed to the Mikro-Atomizer, as shown at right, the PVC aggregate is efficiently reduced to uniform particle size of twenty microns (maximum). An air conveyor carries the ground product to a second collector above the drum loading station.



Mikro-D was chosen for this job because of their background in industrial product recovery. If you have a problem involving collection of sprays or dusts . . . pulverizing or air conveying of finely divided materials . . . Mikro-D are the people to see. Our engineers will work with you to produce the most efficient system for your product.

Genuine Mikro-D Replacement Parts available from large stock within 48 hours.

Mikro-D

PULVERIZING MACHINERY DIVISION

METALS DISINTEGRATING COMPANY INC.

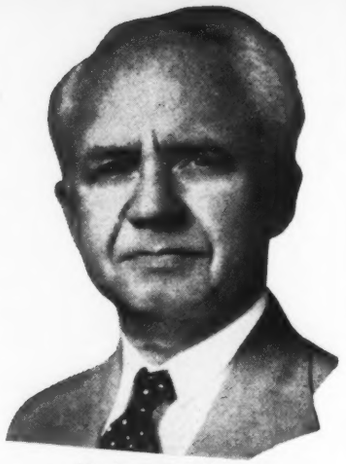
60 Chatham Road — Summit, New Jersey

When inquiring check 1833 opposite last page

SPARKLER
horizontal plate
FILTERS

Undisputed First Choice

with engineers who have had occasion to thoroughly test this type of filter. Shown here are structural features that are the result of over 30 years experience in building this one filter. If it could be made better or cheaper Sparkler would have made it that way long ago.



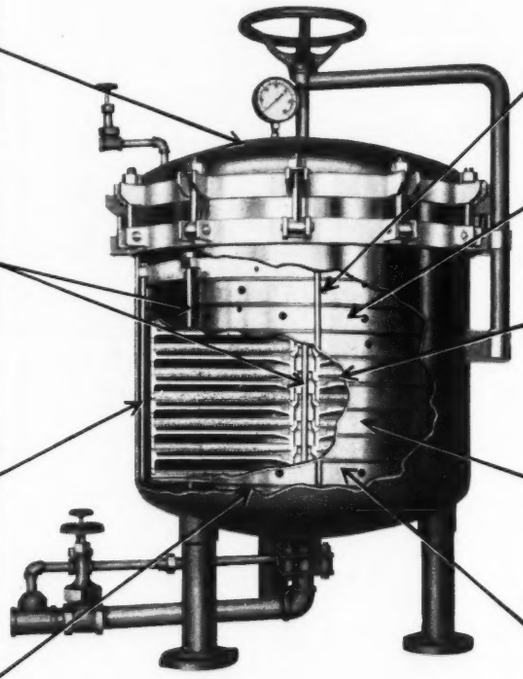
Aloysius C. Kracklauer
Originator of the Horizontal Plate Filter

A.S.M.E. designed construction is standard for pressures up to 60 lbs. on all filter tanks.

Plates sealed independently at center and periphery to assure positive seal.

Plates sealed independent of tank closure to secure a positive seal for both filter plates and for tank cover.

Scavenger plate supported by re-inforced flat bottom tank.



Cartridge plate assembly—removable independently of tank.

Heavy solid plate rings precision machined.

Heavy perforated sheet metal support for filter paper.

A more positive filter seal is obtained when hydraulic pressure is applied to plates externally rather than internally.

Plate designed to reduce flow friction to a minimum.

The Sparkler, original exclusive horizontal plate design and flow principle, has never been equalled for efficiency and dependability in filtering with any and all types of filter aids. The cake maintains its original position as formed regardless of pressure fluctuation flow rate or viscosity. No break-through is possible, even with a complete shut down of the filter. Filtering can be resumed with perfect safety at any time. With Sparkler plate construction a completely sanitary filter can be furnished.

SPARKLER FILTERS

SPARKLER MANUFACTURING CO. MUNDELEIN, ILLINOIS
Sparkler International Ltd.—Manufacturing plants in Canada, Holland, Italy and Australia.
REPRESENTATIVES IN PRINCIPAL CITIES THROUGHOUT THE WORLD

When inquiring check 1834 opposite last page

Mixer-homogenizer

(*Continued from page* 168)

homogenizing zone, where homogenizer subjects it to refinement by hydraulic shear. Complete assembly is installed in a kettle which may be single-shell or jacketed construction, depending upon requirements.

Homogenizing element is powered by motor which is coupled to a shaft terminating in a turbine. This rotates in an enclosed housing, to form the homogenizing head. Turbine revolves at speeds of 3500 to 8000 rpm, creating differential pressure between bottom of turbine and surface of material being processed.

Unrefined material is continuously drawn from bottom of container and forced to pass through restricted openings in the homogenizing head. This shears material and breaks it down in size. Since turbine also acts as pump, material is discharged upward after it passes through homogenizing zone. Material moving up strikes an adjustable deflector plate, which sends it to side of vessel. Here the paddle mixer, powered by separate motor, works material down from side of kettle back into homogenizing zone.

Units are available in laboratory and production models ranging in capacity from 3 to 1000 gal. Kettles can be made of stainless steel, Monel, nickel, or other materials. Wide range of auxiliary equipment and automatic controls are available.

(Eppenbach Agi-Mixer is product of Gifford-Wood Company, Dept. CP, Hudson, N. Y. . . . or for more information reader may simply check 1835 on form which is located opposite last page.)

Non-woven filter felt boosts efficiency of dyestuff filtrations . . .

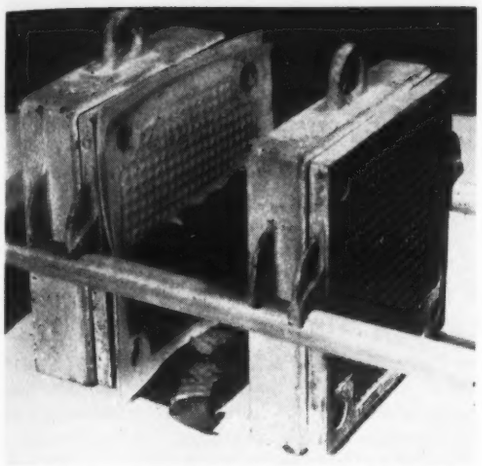
resists acids, alkalis, solvents; can be used between −20 to 150°F, without shrinking

Uses: Filtering aniline dyestuffs and pigments.

Features: Fabric has tensile strength of 2400 psi, resists most strong acids, alkali and salt solutions, and solvents. It can be used anywhere from −20 to 150°F, without shrinking.

Description: Filter felt is composed of Dynel, Union Carbide's acrylic fiber, combined with a required percentage of thermoplastic binder fiber. Because of its non-woven fibrous makeup, it retains smaller particles than is possible with conventional woven cloth. Material has rapid wettability, quick cake formation, and easy cake release properties. It will stand up under rugged treatment, and can be safely scraped and hose washed.

The felt is available in 40-yard rolls in standard



Quick cake release ability of new Dynel filter felt is illustrated on this 7 x 7" plate-and-frame press. Cake, in this case, was composed of 95% McNamee clay and 5% carbon black

widths of 72 inches. It can also be obtained in widths from 44 to 76 inches or cut to special sheet sizes, depending on specific filtration requirements. Although initially more expensive than conventional filter cloth, fabric's greater efficiency and longer service life (up to 10 times greater) make it more economical in the long run.

(Dynel Windsor Felt is product of American Felt Company, Dept. CP, Glenville Road, Glenville, Conn. Check 1836 opposite last page.)

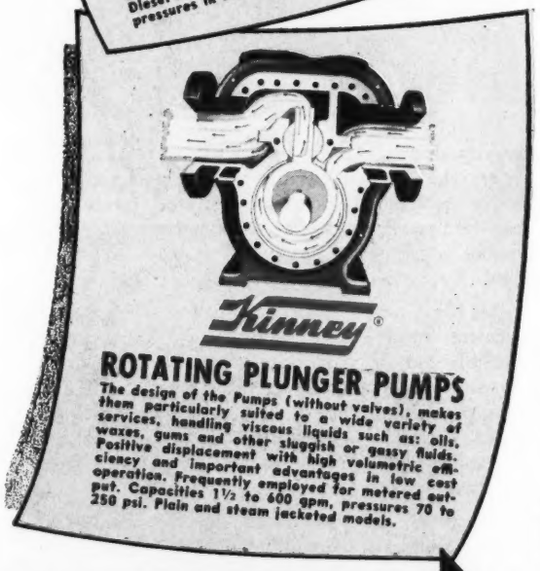
"I hear she put in a complaint about where we set that new mixing tank."

Cartoon by Sherman L. Peeno, Procter & Gamble Co., Cincinnati, Ohio.

How Can You Reduce Operating Costs and Maintenance in Handling Viscous Fluids?

2 WINNING ANSWERS TO THE $64 QUESTION!

Kinney
HELIQUAD GEAR PUMPS
For long service and trouble-free performance. Positive displacement Pumps with non-pulsating delivery . . . handle fluids ranging from gasoline or alcohol to heavy tars and waxes. Plain or steam jacketed models . . . with special metals for handling corrosive materials. Arranged for electric motor, steam engine, steam turbine, gasoline or Diesel engine drive. Capacities 5 to 2500 gpm with pressures in most models to 300 psi.


Kinney
ROTATING PLUNGER PUMPS
The design of the Pumps (without valves), makes them particularly suited to a wide variety of services, handling viscous liquids such as: oils, waxes, gums and other sluggish or gassy fluids. Positive displacement with high volumetric efficiency and important advantages in low cost operation. Frequently employed for metered output. Capacities 1½ to 600 gpm, pressures 70 to 250 psi. Plain and steam jacketed models.

WRITE . . .
Get the dollar-saving facts about KINNEY Heliquad Gear and Rotating Plunger Pumps. Write for Bulletin No. L51A today.

Let's take an objective look at your current Liquid Handling practice.

For example: where the requirement is for moving fluids of vastly different viscosities, do you have Pumps versatile enough to handle all these needs?

Or, with materials that must be pumped hot . . . are you wasting Btu using Pumps that require excessively high temperatures?

Kinney®

HELIQUAD GEAR and ROTATING PLUNGER PUMPS

have, for years saved situations that call for "pumping unpumpables," with complete dependability and minimum operating and maintenance cost. If Pump down-time is a threat to your profits – investigate KINNEY Heliquad Gear and Rotating Plunger Pumps *before* trouble occurs!

KINNEY MFG. DIVISION
THE NEW YORK AIR BRAKE COMPANY
3573 WASHINGTON STREET • BOSTON 30 • MASS.

KINNEY Mfg. Division
The New York Air Brake Company
3573B Washington St., Boston 30, Mass.

Kindly send me descriptive literature on KINNEY Pumps to lower Operating and Maintenance Costs.

Name_____

Company_____

Address_____

City_____ Zone____ State_____

When inquiring check 1837 opposite last page

WHEN SPECS CALL FOR...

PRESSURE VESSELS

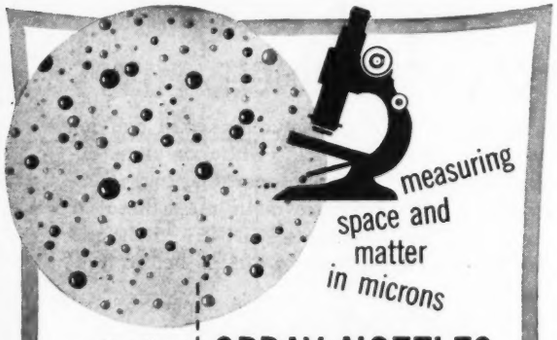
for the Chemical Processing Industry on the West Coast

Save on transportation costs, manufacturing time and put yourself in a more competitive position by contacting an experienced "on the spot" source when planning the procurement of process and plant equipment for the West Coast. Send prints for prompt quotation on your next job.

Request Brochure No. M-57

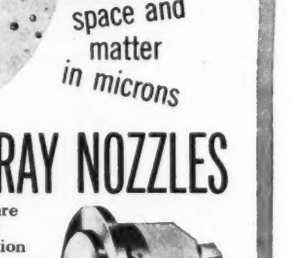
PS F SINCE 1900 **PUGET SOUND FABRICATORS, INC.**
Craftsmen in Metals
3670 E. Marginal Way • Seattle 4, Wash.
Craftsmen in steel plate and alloys up to 1"

When inquiring check 1838 opposite last page



to give you better **SPRAY NOZZLES**

The microscopic structure of a spray is a world of spherical bodies in motion with "wide" spaces in between. This is one of the levels of observation where our research engineers obtain important data for better spray nozzle design and performance.



For complete information, write for Catalog 24.

SPRAYING SYSTEMS CO.
3216 RANDOLPH • BELLWOOD, ILLINOIS

ADVANCED SPRAY NOZZLE DESIGN FOR NEW DIMENSIONS IN CONTROL AND PERFORMANCE

When inquiring check 1839 opposite last page

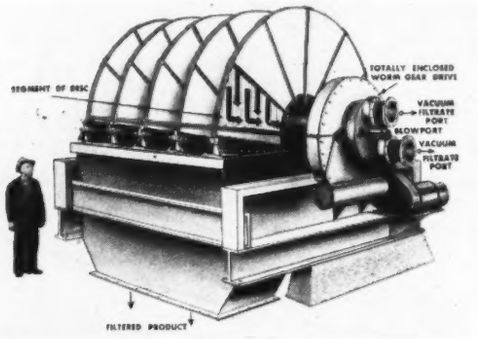
Greater filter capacity assured with large 9-ft diameter disc filter . . .

unit has 12 segments per disc instead of the usual 10

Uses: Dewatering pulp and similar materials.

Features: Unit has 9-ft diam discs. Each disc provides 105 sq ft of filter area. There are 12 segments per disc instead of the conventional 10. This gives greater filter capacity because more complete segments are under vacuum each revolution.

Description: Filters are available with a minimum of two and a maximum of 12 discs. The 12 redwood segments of each disc are grooved for



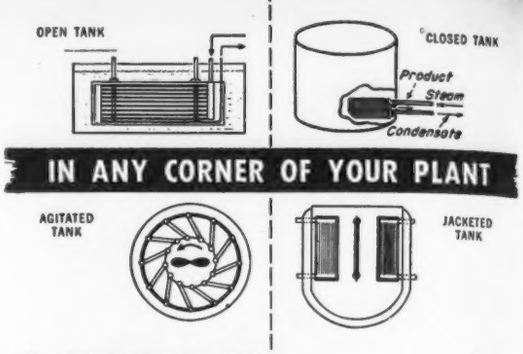
Individual segments on filter's discs are grooved for gravity drainage prior to discharge

gravity drainage prior to discharge, resulting in drier cake. Each sector has welded steel support, heavy steel radial rods, and cast steel frame and bag clamps. Bag scrapers are floating units with rubber edge and steel frame. Cotton twill cloth is used for standard bags.

Filter has totally enclosed worm gear drive. Large diameter automatic filter valve has double outlets. Flexible bellows-type hose connections to valve ports prevents tension on valve cover from vacuum piping and permit valve to seat tightly at all times. The valve wearing plate is renewable. Filter's ¼"-thick steel tank is supported by heavy steel external frame.

(Disc filters are product of the Denver Equipment Company, Dept. CP, 1400 17th St., P.O. Box 5268, Denver 17, Colorado . . . or for more information check 1840 opposite last page.)

This month's Processing and Engineering Data section starts on page 208



IN ANY TYPE OF TANK PLATECOIL® CUTS HEAT TRANSFER COSTS

Use Platecoil heat transfer units singly, in series or in banks. Install them on end, flat or on their sides. Compact, light in weight and high in efficiency, they fit in any type of tank, do a better job and save money compared to old-fashioned pipe coils.

Fast delivery from stock

Write today for your copy of Bulletin P-54.

PLATECOIL Division **Tranter Mfg. Inc.** LANSING 4, MICHIGAN

You'll find our catalog in Sweet's Plant Engineering file

When inquiring check 1841 opposite last page

When inquiring check 1842 opposite last page

Units chill brine to −120°F, have accuracy of ±2°F

Low-temperature brine chillers designed to produce constant source of brine to −120°F are described in illustrated four-page bulletin. Chillers feature control system which maintains constant outlet brine temperature with accuracy of ±2°F.

"Low Temperature Brine Chillers" is issued by Murphy & Miller, Inc., Dept. CP, 1326 S. Michigan Ave., Chicago 5, Ill. Specify 1843 opp. last page.

Full line of kettles covered in catalog

Sizes, capacities, and uses of various kettles are presented in illustrated 20-page catalog. Designed to serve virtually every cooking need in the chemical and food industries, the kettles are constructed of stainless steel and meet ASME specifications.

Kettle catalog is issued by Hamilton Copper and Brass Works, Division of the Brighton Corporation, Dept. CP, 820 State Ave., Cincinnati 4, Ohio. Specify 1844 opposite last page.

Describes features of filter for phosphoric acid

Two-page, two-color leaflet explains operation, gives advantages, and lists sizes of traveling-pan filter. Layout diagram and equipment and installation photographs are also included.

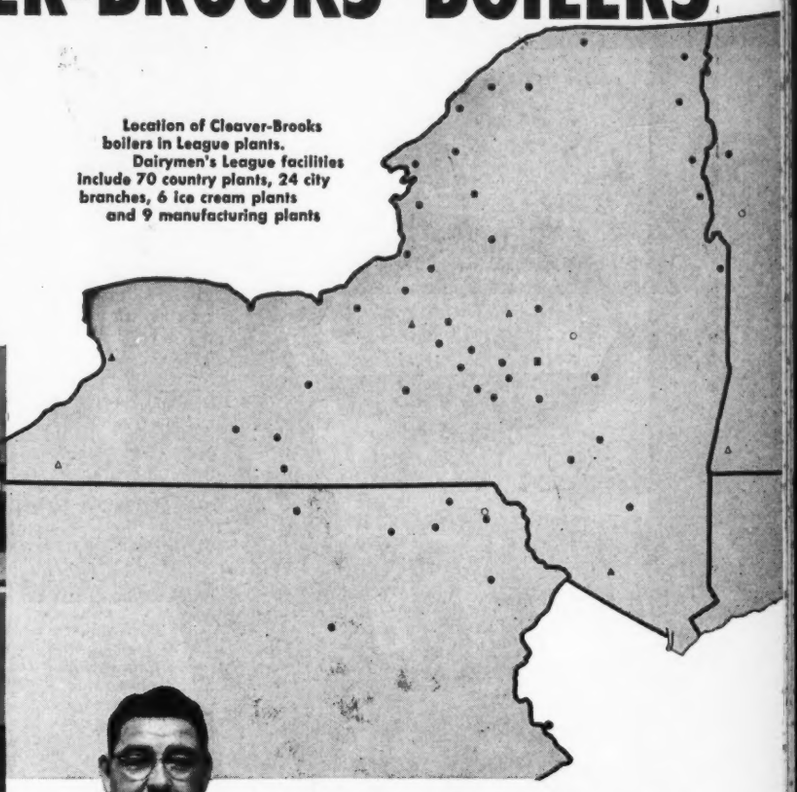
"Traveling-pan Filter" is issued by Dorr-Oliver Incorporated, Dept. CP, Barry Place, Stamford, Conn. Specify 1845 opposite last page.

For more information on product at right, specify 1846 . . . see information request blank opposite last page.

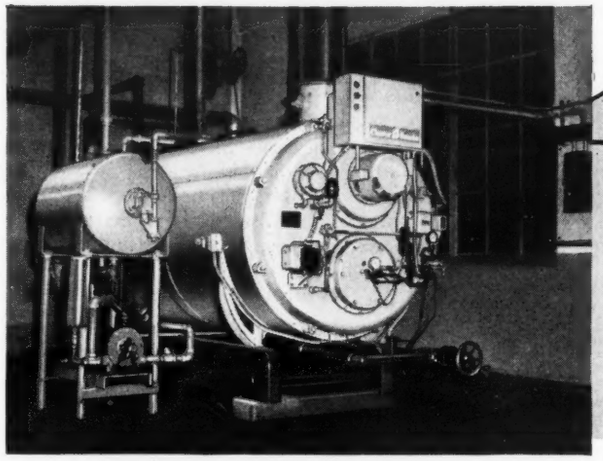
One of America's largest and leading dairy associations uses

69 CLEAVER-BROOKS BOILERS

SEE OUR EXHIBIT
BOOTH NOS. 648-650
INTERNATIONAL HEATING & AIR CONDITIONING EXPOSITION
CHICAGO
FEB. 25 — MARCH 1



Location of Cleaver-Brooks boilers in League plants. Dairymen's League facilities include 70 country plants, 24 city branches, 6 ice cream plants and 9 manufacturing plants



MILTON, PA.— This country plant is supplied with quick, dry steam from a Cleaver-Brooks 60 hp light-oil fired CB boiler.

"Our 69 Cleaver-Brooks boilers are a key part of our production — their unusually high efficiency, sanitary, clean operation have helped us grow and prosper", says Ken Dodge, staff engineer for Dairymen's League Cooperative Association.

"Maintenance is low. We average far less than one service call per boiler per year," he adds.

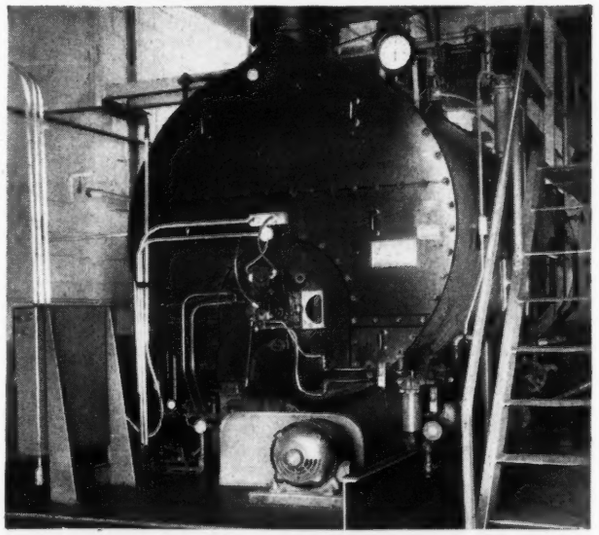
Dairymen's League Cooperative Association, serving 25,000 dairy farmers and thousands of consumers in New York, Pennsylvania and New Jersey, has been a steady user of Cleaver-Brooks boilers for 20 years.

Like any dairy company, the League finds steam essential for the production of quality dairy products. Their boilers are the work horses of their plants — supplying steam for pasteurizing, heating, cleaning and processing.

And Cleaver-Brooks boilers, with their exclusive four-pass, forced draft design and clean, quiet operation are especially suited to dairy plant operation.

Famous dairies the country over are profiting with the many advantages of Cleaver-Brooks boilers, available in a complete line. You can select from 110 models in 18 boiler sizes, 15 through 600 hp . . . oil, gas and combination oil and gas fired.

For more information contact your nearby Cleaver-Brooks representative. Or write Cleaver-Brooks Company, Dept. B, 349 E. Keefe Avenue, Milwaukee 12, Wis. Cable Address: CLEBRO — Milwaukee — all codes.



UTICA, N.Y.— In this city plant a 250 hp LR heavy-oil fired boiler provides all steam for pasteurizing, cleaning, heating and processing.

Cleaver Brooks

ORIGINATORS OF THE SELF-CONTAINED BOILER

When inquiring check 1847 opposite last page

briefs

from contemporary publications

Polyurethane rubber

Polyurethane rubber as a material of construction shows higher stress capacity than does natural rubber. Applications to tires, high-pressure pump valve inserts, motor mounts, sponges, and foams are discussed. Three pages, two tables, five figures. (*"Mechanical Engineering," November* 1956, *page* 1016.)

Organic coatings for paper

As coatings for paper, nitrocellulose imparts high gloss, cellulose acetate results in good aging properties, and ethylcellulose produces tough films. Four pages. (*"Paper Industry," November* 1956, *page* 677.)

Silicones and textiles

Functions of silicones in the textile industry are covered under the headings of chemistry, applications of silicone emulsions, and properties imparted. Many structural formulas are given. Five pages, eight tables, one reference. *("American Dyestuff Reporter," October 8, 1956, page P771.)*

Cone plate viscometer

Cone plate viscometers subject samples to definite, uniform shear rates and are designed for non-Newtonian liquids. This type of viscometer is compared with the one that employs coaxial cylinders. Five pages, ten figures, ten references. (*"Analytical Chemistry," November* 1956, *page* 1710.)

Fluid coke

The burning of fluid coke is covered under headings of fluid coking process, field tests, furnace design, and test results. Five pages, three figures, three tables. *("Mechanical Engineering," October 1956, page 921.)*

Radiation chemistry

This survey of radiation chemistry deals with experimental techniques and results, reaction mechanisms, and free radicals. Five pages, one table, five figures, 55 references. (*"Chemistry in Canada," October* 1956, *page* 46.)

Instrumentation of bleach plants

Instrumentation for bleaching sulfite and kraft pulps and for manufacture of chlorine dioxide is covered. Three flow sheets are given in detail. Three pages. (*"Paper Trade Journal," November* 12, 1956, *page* 38.)

Manuscript preparation

Helpful suggestions are given for the preparation of technical papers in the fields of chemistry and chemical engineering. Three pages, (*"Journal of Chemical Education," October* 1956, *page* 523.)

Aluminized steel

Aluminized steel as material for porcelain enamel is discussed under headings of properties, lighter sheets, costs, and qualities. Two pages. (*"Ceramic Industry," November* 1956, *page* 76.)

Corrosion by fertilizers

In nitrogen fertilizer solutions, aluminum and several chromium and chromium-nickel stainless steels were not attached; carbon steel was attacked. In solutions of complete-mix fertilizers, chromium-nickel steels were not attacked, but aluminum, carbon steel, and chromium stainless steels were attacked. Seven pages, seven tables, nine figures, eight references. *("Corrosion," November 1956, page 53.)*

abstracts of pertinent articles in other industrial publications . . . selected by CP editors as a service to you . . .

Sugar from beets

Rupture of sugar beet cells at high velocities favors direct preparation of juice and pulp from which sugar is washed. Sugar recovery of 99% is realized when centrifugal forces of 666 gravities are employed. Five pages, two tables, four figures. (*"Chemical Engineering Progress," August* 1956, *page* 314.)

Micro-organisms

Applications of micro-organisms to production of antibiotics is discussed in paper from England. Antibiotics from fungi are distinguished from those that have their origin in bacteria. Three pages, one table. (*"Chemical Products," November* 1956, *page* 453.)

Determination of uranium

In connection with the determination of uranium, this paper from England shows that perchloric acid should be used for chemical treatment and that dilute sulfuric acid should be added to the cold solution before polarographical tests are made. Seven pages, five tables, six figures. (*"The Analyst," September* 1956, *page* 512.)

Control of noise

First of a series on how to control industrial noise, paper deals with terminology, acoustic power, and transmission of sound. Four pages, one table, five figures. *("Plant Engineering," November 1956, page 98.)*

Oil geology

Recent trends in oil geology are covered in this paper from England. The searches for nonstructural traps are featured. Five pages, three references. *("Petroleum," October 1956, page 354.)*

Thermoplastics

Methods for choosing tough, rigid thermoplastics are covered. Mechanical, electrical, and optical properties are included; cost data are considered. Much of presentation is tabular. Two pages, one table. (*"Product Engineering," November* 1956, *page* 167.)

Analysis of aluminum alloys

Practical, reliable, time-saving methods for determination of copper, chromium, silicon, iron, nickel, and bismuth in alloys of aluminum are presented. Two pages, two photographs. (*"Foundry," November* 1956, *page* 118.)

Paper coatings

Waxes have high resistances to water vapor and are thus suitable coatings for paper. Their softness and brittleness are overcome by addition of polyethylene and polyisobutylene. Three pages. *("Paper Industry," October 1956, page 480.)*

Corrosion testing

Accelerated testing of metallic surfaces is described. The salt spray test and its various modifications are discussed in detail. Five pages, four tables, three figures, four references. (*"Metal Finishing," November* 1956, *page* 48.)

Aluminum in alloys

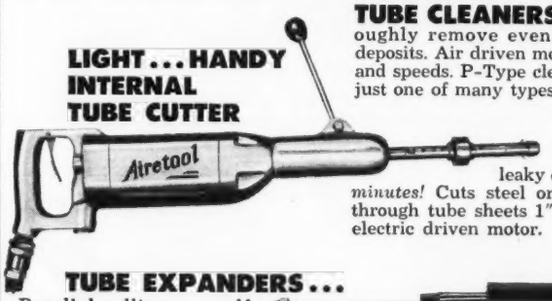
Analysis method makes use of the fact that 8-hydroxyquinaldine does not react with aluminum but does react with many elements that interfere with the spectrophotometric determination of aluminum. Method is applied to alloys that contain up to 10 percent of aluminum. Eight pages, eight tables, two figures, 11 references. (*"Analytical Chemistry," October* 1956, *page* 1520.)

toughest tube maintenance jobs are made easy with AIRETOOL equipment

See for yourself why so many refinery engineers specify AIRETOOL for their tube maintenance programs. AIRETOOL Equipment handles easy . . . is rugged, packs plenty of power and speed, won't bog down or break down during use. AIRETOOL does the *best* job, quickly, economically.

POWERFUL . . . FAST CUTTING TUBE CLEANERS quickly and thoroughly remove even hardest scale and deposits. Air driven motors in various sizes and speeds. P-Type cleaner head shown, is just one of many types available.

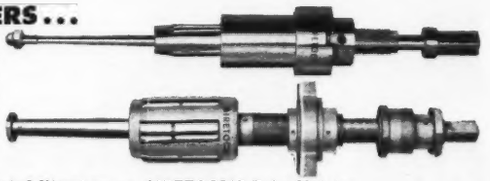
LIGHT . . . HANDY INTERNAL TUBE CUTTER



New . . . removes leaky or damaged tubes in *minutes!* Cuts steel or non-ferrous tubes through tube sheets 1" to 4" thick. Air or electric driven motor.

TUBE EXPANDERS . . .

Parallel rolling . . . self-feeding . . . AIRETOOL Tube Expanders roll tight, accurate tube joints with maximum bond, uniform expansion and tightness throughout full thickness of tube sheet.



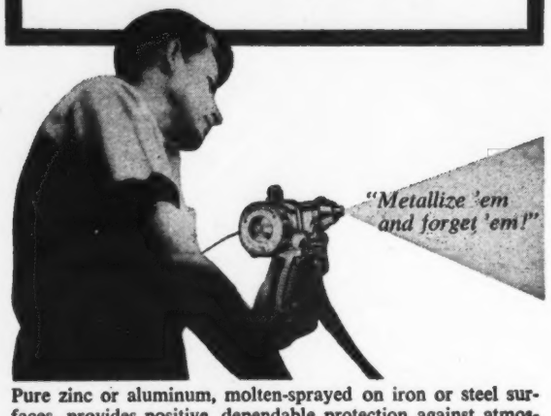
Write for illustrated literature on AIRETOOL'S Tube Maintenance Equipment, or see your nearest Airetool Representative.

AIRETOOL
MANUFACTURING COMPANY
SPRINGFIELD, OHIO

BRANCH OFFICES: New York, Chicago, Tulsa, Philadelphia, Houston, Baton Rouge.
REPRESENTATIVES: in principal cities of U.S.A., Canada, Mexico, South America, England, Europe, Puerto Rico, Italy, Japan, Hawaii.
EUROPEAN PLANT: Vlaardingen, The Netherlands
CANADIAN PLANT: 37 SPALDING DR., BRANTFORD, ONT.

When inquiring check 1848 opposite last page

Want to forget about rust for 20 years?



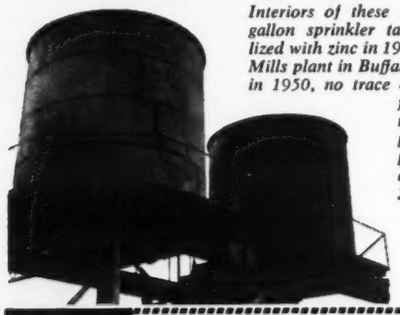
Pure zinc or aluminum, molten-sprayed on iron or steel surfaces, provides positive, dependable protection against atmospheric corrosion for upwards of 20 years without *any* further maintenance.

These unique coatings are *mechanically* bonded to the surface—adhesion is *not* dependent on volatile vehicles or binders. Scaling, crazing, blisters are eliminated. Protection is *positive*. "Metallize 'em and forget 'em!"

Why not find out more about how you can forget about rust on iron and steel structures and equipment—eliminate the nuisance and expense of constant painting and repainting? Write for descriptive Bulletin 62-B—it's free.

the Metco Systems*

—a series of 18 basic engineering specifications developed over 19 years of experience with pure zinc and aluminum coatings on many different types of structures and equipment in a wide range of corrosive conditions. The *Metco Systems* provide for standardization of surface preparation, coating thicknesses and organic aftercoatings for various surface conditions and appearance requirements.



Interiors of these two steel 15,000 gallon sprinkler tanks were metallized with zinc in 1934 at the General Mills plant in Buffalo. Last inspected in 1950, no trace of rust could be found, and zinc remaining is expected to provide protection for an additional 15 to 20 years.

METCO

Metallizing Engineering Co., Inc.
1143 Prospect Ave., Westbury, L. I., New York • cable: METCO
In Great Britain:
METALLIZING EQUIPMENT COMPANY, LTD.—Chobham near Woking, England

DON A. WATSON METALLIZING ENGINEERING CO., INC.
1143 Prospect Ave., Westbury, Long Island, N. Y.

☐ Please send me, without obligation, Bulletin 62-B.
☐ Please have Metco Field Engineer call.

NAME_____
COMPANY_____
STREET_____
CITY_____ ZONE_____ STATE_____

When inquiring check 1849 opposite last page

Transporting and stacking maintenance materials, side-loading lift truck —

increases effective sto and manpower eff

FRANK E. McELROY, Assistant Editor
With **JOHN McCARTHY,** Training Foreman
Transportation Department, Bayway Refinery
Esso Standard Oil Co., Linden, N.J.

Problem: Efficient storage and handling of heavy materials used for refinery maintenance presented a challenging problem to the management of Esso's Bayway refinery.

Big problem arose in handling long, heavy items, such as pipes and conduit, lumber, heat exchanger bundles, and "H" and "I" beams. At first, two units were used: either a fork truck or crane and a flat-bed or straddle carrier. Not only did this require a crew of three of four, but it necessitated that materials be stored on trays or on the ground, which of course, was an uneconomical use of storage space.

Heat exchanger tube bundle is placed on "Christmas tree" storage rack. Because truck loads from side, loads of lengths up to 80' are easily handled

storage area efficiency

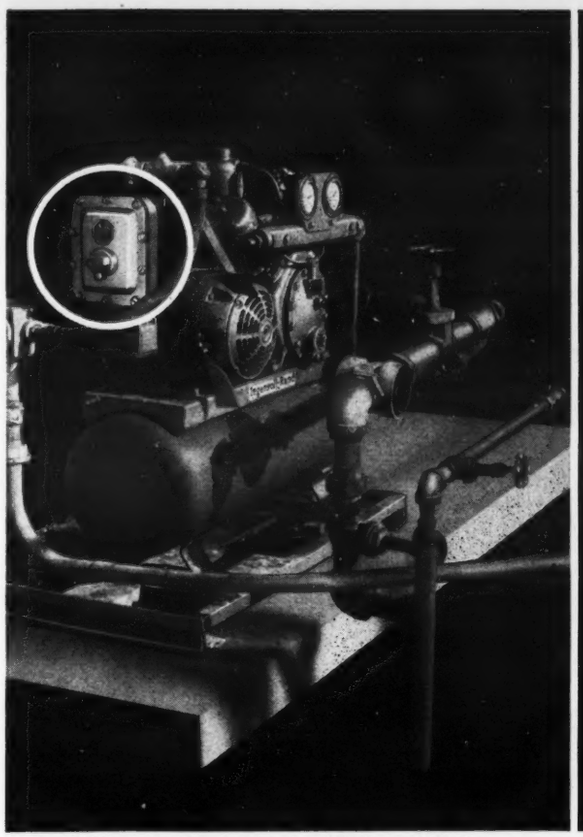
As more and more production units went on-stream at Bayway, inventory headaches became more intense. So did storage and handling costs. Something had to be done — and quick.

Solution: About five years ago, Esso started using side-loading lift trucks. These have the advantage of approaching parallel to their load, reaching up and over to pick it up, then carrying

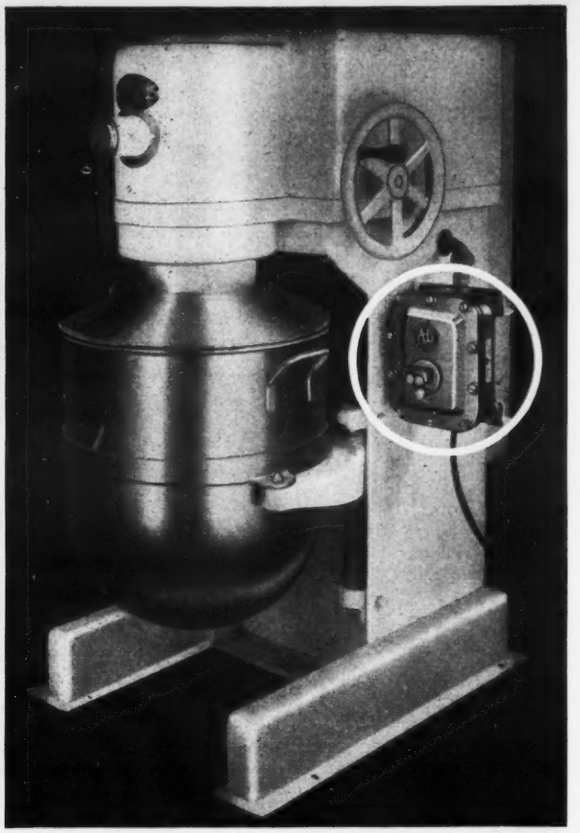
(Please turn to next page)

Long pipe lengths are stored on wooden spacers. When truck loads, two steel legs automatically emerge from loading side, keep truck from tipping

Trucks have capacity for large payloads. Note license plate so truck can be used for between-plant service. Running loaded to 25 miles per hour, unit is efficient on the road



Allen-Bradley explosion-proof starter on LPG Ingersoll-Rand compressor



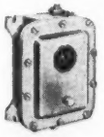
Allen-Bradley explosion-proof solenoid starter on Triumph paint mixer

CUT YOUR ELECTRICAL MAINTENANCE COSTS

by choosing the correct enclosure for every job

Type 1 General Purpose

Type 4 Watertight



Type 7 Explosion-proof

When you order a motor starter, be sure to specify the type of enclosure that will give adequate protection to the starter and operator under the conditions that exist where it is used.

In the Allen-Bradley line is a variety of standard enclosures that satisfy any operating requirement. They assure long, trouble-free service and thereby cut "down time" due to unnecessary inspection or also motor starter failures.

Bulletin 709 Size 1 Solenoid Starter

Since all Allen-Bradley motor starters use double break, silver alloy contacts which require no maintenance, bolted enclosures are no problem for the serviceman. Actually, you can install an Allen-Bradley starter and forget it. There is only ONE MOVING PART ...the solenoid plunger. There are no linkages, bearings, pins, or pivots to rust and stick. Such simplicity is your guarantee of dependability.

Send for the A-B Handy Catalog!

Type 8 Hazardous Corrosive Gas

Type 9 Hazardous Dust

Type 11 Corrosion-proof

Allen-Bradley Co.
104 W. Greenfield Ave.
Milwaukee 4, Wis.

In Canada—
Allen-Bradley Canada Ltd.
Galt, Ont.

ALLEN-BRADLEY

SOLENOID MOTOR CONTROL

QUALITY

When inquiring check 1850 opposite last page

Side-loading Lift Truck

(*Continued from preceding page*)

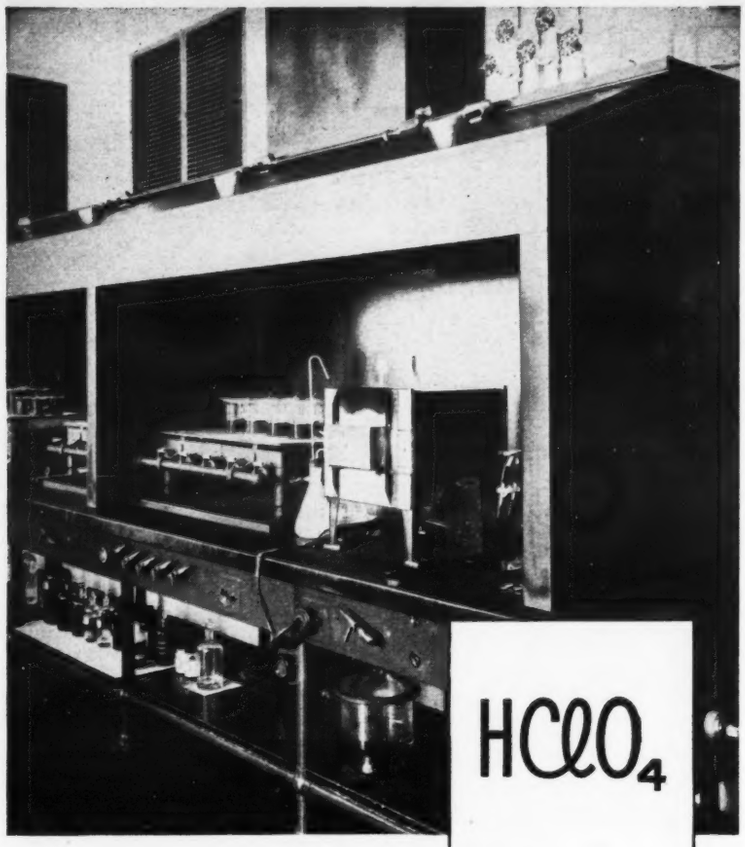
it away without ever turning sideways.

To gain maximum space utilization, Esso built a concrete pad, approximately 300′ x 500′ in area and 6″ thick. On this pad they erected steel "Christmas trees" for off-ground storage, as shown in the pictures. These racks are 11½ feet high, and the aisles are 11 feet wide.

Maximum load that Esso handles with the sideloaders is eight tons. The units are gasoline engine-powered and cabs are equipped with two-way Motorola radio setup, to speed operations. Truck is 19½′ long, 8′ wide. Forks reach 6¼′ out and 12′ up and can be tilted ±5°.

Results: In addition to the advantages of permitting fuller utilization of storage area by allowing long lengths to be stored without trays, the sideloaders are easy to handle. One man runs each truck, efficiently and quickly. Costs have been held down.

(Traveloaders are products of The Baker-Raulang Co., Dept. CP, PO Box 5579, Cleveland 1, Ohio . . . or for more information check 1852 on form opposite last page.)



Let's talk "LOW ABSORBENCY"

For perchloric acid fume hoods.

Alberene Stone has a low absorbency factor of 0.15%. It's essentially nonstaining. Easily cleaned. And readily machined for tongue and groove, watertight construction.

Both of these features are absolutely essential for perchloric hoods – where thorough water flushing and removal is necessary to keep them deposit-free.

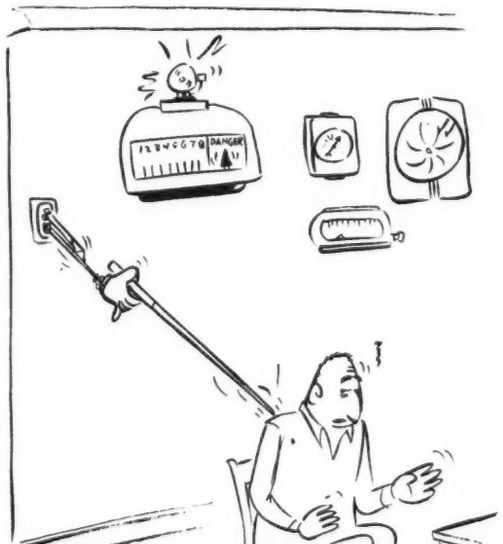
Further, with Alberene Stone – *the natural silicate stone whose surface goes all the way thru* – the all-silicate mineral components resist chemical attack.

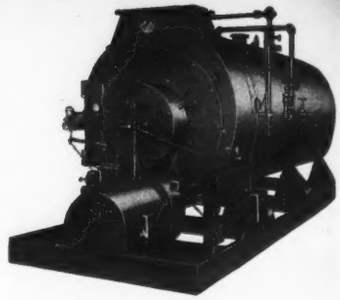
Our engineers are ready to help you select or design perchloric hoods or other special-purpose hoods. Alberene Stone Corporation, 419 Fourth Avenue, New York 16, N. Y.

ALBERENE STONE

provides LOW ABSORBENCY protection

When inquiring check 1851 opposite last page





Here's CYCLOTHERM'S *3-WAY CUT* in STEAM PROCESSING COSTS!

If you process by steam, use steam by Cyclotherm. You cut costs in these three vital ways:

FUEL COSTS

Cyclotherm Cyclonic Combustion means just what it says—controlled fuel and air, whirling at 200 mph, forming a cyclone in the furnace! This high velocity burning assures maximum efficiency in combustion and heat transfer, resulting in lower fuel consumption.

MANPOWER COSTS

A fire without a fireman! Electronic controls operate the Cyclotherm safely and automatically. Smaller models cycle on and off as steam is required. On larger models, precision modulation coordinates the fuel-air ratio to the load demand, from 30% to 100% of rated capacity.

INSTALLATION AND MAINTENANCE COSTS

Cyclotherm is factory assembled and factory pre-tested. All you do is make five simple connections. 50% maintenance savings are not uncommon. Return tubes cleaned in minutes with no removal or replacement of refractories. No standby unit needed.

And remember—one-third smaller than ordinary generators of similar capacity, a Cyclotherm fits almost anywhere. Many plants have installed two Cyclotherms for utmost flexibility and power. Burns gas or oil with quick changeover. 18 to 500 hp, 15 to 200 psi.

YEARS AHEAD IN STEAM GENERATION
CYCLOTHERM
STEAM AND HOT WATER GENERATORS

Cyclotherm Division,
National-U. S. Radiator Corp.
2930 E. First St., Oswego, N. Y.

Please send me a free copy of your booklet giving full information on Cyclotherm Steam and Hot Water Generators.

Name.....
Company.....
Address.....
City.....Zone.....State.....

When inquiring check 1853 opposite last page

Fast, efficient vacuum pump handles 10,400 micron-cfm at 10 microns . . .

motor operates within vacuum, no need for shaft seals

Uses: Pump provides high vacuum for various chemical operations and processes.

Features: Unit is reported to be fastest mechanical pump in 10^{-1} to 10^{-5} mm Hg range. The 39x20x22" size has throughput of 10,400 micron-cfm at 10 microns.

Description: Developed in Germany, unit has pair of figure-eight-shaped rotors which counter-rotate in pump chamber. These rotary pistons never touch each other or the pump casing. No oil sealing in pump chamber is required, preventing contamination of vacuum system with back-streaming vapors. Motor operates within vacuum, making shaft seals unnecessary. Roughing is done directly through pump without need of by-pass or valving. Pumps are available in six standard sizes, and cover maximum speed ranges from 92 to 4900 cfm.

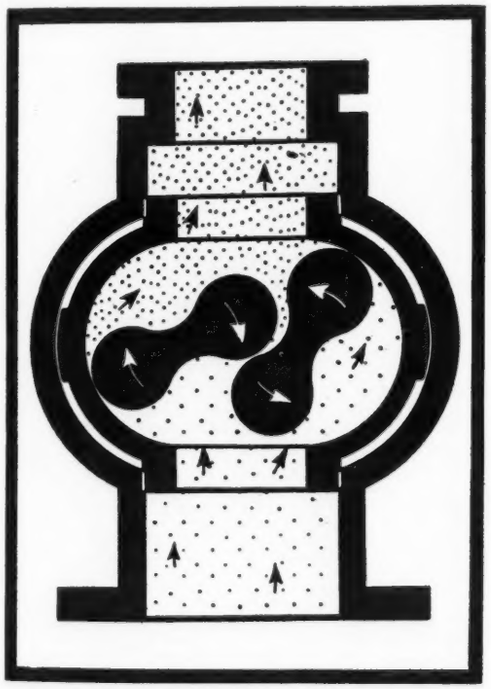


Figure-eight-shaped rotors never touch each other or pump casing, eliminating need for oil sealing in pump chamber

(Roots-type vacuum pump is available in US from Rochester Div., Consolidated Electrodynamics Corp., Dept. CP, 1775 Mt. Read Blvd., Rochester 3, N.Y. Check 1854 opposite last page.)

Ouija boards are passé

Time was, when a person had a question, out would come the ouija board for an answer. This wasn't too accurate a system, of course . . . but a lot of people put a lot of faith in what the ouija board told them.

Times change — and today accuracy is the keyword. That's why the modern business publication wants its circulation audited.

In joining BPA* the publisher is taking an important step toward sound and accurate planning in your behalf. It means that he is checking, double-checking and constantly rechecking —

- **Who you are**
- **Where you work**
- **What your job is**

He wants and needs this information — and the BPA* audit can assure both him and his advertisers that he is getting his magazine into the hands of people *qualified by their common interests* to receive it. It helps him to give you —

- **Editorials that will *help you in your work***
- **Advertising that will *have value to you***

He can serve you even better if you will complete surveys and questionnaires which he may send you and if you will give him your thoughts and opinions on the editorials and advertisements in his magazine.

You, the reader, are the *key person* to the publisher — and the BPA* audit helps him in his never-ending effort to think about you and design his magazine for you.

You, the reader, benefit when the circulation of a publication is audited by . . .

***BUSINESS PUBLICATIONS AUDIT OF CIRCULATION, INC.**
420 Lexington Avenue New York 17, N. Y.

BPA

A Non-Profit, Tripartite Membership Corporation of Advertisers, Advertising Agencies and Business Publications

Immediate delivery!

LOW COST ROTARY PUMPS FOR SEVERE CORROSIVE SERVICE

PRICES START AT $75

Whether you're handling acids or alkalies — viscous or non-lubricating fluids — there's an Eco ALL-CHEM rotary pump for the job.

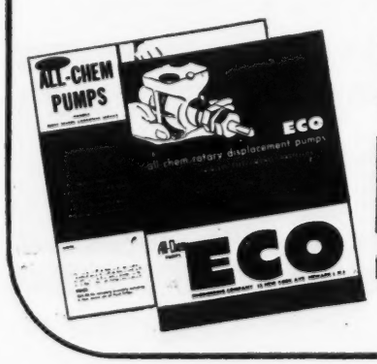
Choose from these corrosion-resistant materials of construction:

HOUSINGS—Bronze, 304, 316 and Carpenter 20 stainless, Hastelloy C, Monel

SHAFT SEALS—Teflon packing rings or exclusive fluid Teflon stuffing box seal

CHECK THESE ECO FEATURES:

- **Capacities to 10 gpm, pressures to 100 psi.**
- **Viscosities to 900 SSU.**
- **Linear non-surging delivery.**
- **Self-priming with non-volatile liquids.**
- **All parts interchangeable and in stock.**
- **V-belt, variable speed, air or electric motor drives.**
- **Adaptable for agitating, pumping shear-sensitive fluids under pressure and for constant flow metering.**



If you have a pumping problem that involves corrosive fluids, write or 'phone Eco. Our engineering advisory service is at your disposal. Write for bulletins AC56 and FT56.

the big name in small pumps

ECO

ENGINEERING COMPANY

12 NEW YORK AVE., NEWARK, N. J.

MARKET 4-6565

When inquiring check 1855 opposite last page

Independent controls vary flow, opening and closing speed of solenoid valve . . .

manual-opening stem allows valve operation in case of power failure or emergency

Uses: Unit is primarily designed for filling operations, hydraulic systems, and elevators. It can be used in a variety of general service applications.

Features: Solenoid valve has independent controls for manual opening, adjustment of flow, as well as opening and closing speed. Controls are

Independent controls on solenoid valve are grouped in a cluster for convenient adjustment

grouped in a cluster for convenient adjustment. Manual opening stem allows operation of valve in case of power failure or emergency. All adjustments are independent of each other.

Description: Unit is available in all standard sizes from ½" to 2". Present maximum capacity is 300 psi. It can be mounted on piping running at any angle.

(Type HV solenoid valve is a product of J. D. Gould Co., Dept. CP, 4707 Massachusetts Ave., Indianapolis 18, Ind. Check 1856 opp. last page.)

Over 1500 gasket stock dies listed in catalog

Gaskets, shims, and washers in variety of styles, shapes, and material are detailed in 28-page catalog with loose-leaf binder cover. Section listing more than 1500 stock dies is featured. Drawings and photographs show different styles of gaskets.

"Gaskets for Industry" is issued by Chicago-Wilcox Mfg. Co., Dept. CP, 7701 S. Avalon Ave., Chicago 19, Ill. Specify 1857 opposite last page.

Now EVERYONE can get SNAP-ON!

G-B SNAP-ON DISTRIBUTORS

(See ad on facing page)

ALBUQUERQUE, Mt. States Insulation Co.
AMARILLO, Ball Distributing & Engr. Co.
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BROOKLINE, Mass., Homans-Kohler, Inc.
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CHARLESTON HEIGHTS, S. C., Stafford Insulation Co.
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CHATTANOOGA, Guy M. Beaty & Co.
CHICAGO, E. C. Carlson Co.
CINCINNATI, R. E. Kramig & Co.
CLEVELAND, The Miles Materials Co.
COLUMBIA, S. C., Southern States Iron Roofing Co.
COLUMBUS, Santeler Brothers
DALLAS, Insulation Supply Co., Inc.
DAVENPORT, Republic Electric Co.
DENVER, Gene Wright Lumber Co.
DETROIT, Coon-DeVisser Co.
EL PASO, Insulation & Specialties Co.
FARGO, N. D., Smith, Inc.
FT. SMITH, Ark., Gunn Distributing Co.
FT. WAYNE, Ind., M. H. Hilt, Inc.
FT. WORTH, The Bracken Co.
GREENSBORO, N. C., Starr Davis Co., Inc.
GULFPORT, Miss., Paine Supply Co.
HOUSTON, Precision Insulation Co.
INDIANAPOLIS, Central Supply Co.
IRON MOUNTAIN, Mich., Champion, Inc.
JACKSON, Miss., Paine Refrigeration Supply Co.
JOPLIN, Mo., Joplin Cement Co.
KANSAS CITY, Kelley Asbestos Co.
LITTLE ROCK, Gunn Distributing Co.
LOS ANGELES, Western Fibrous Glass Products
Plant Insulation Co.
LOUISVILLE, General Insulation & Roofing Co.
MADISON, Wis., J. D. Wilson Co.
MEMPHIS, John A. Denie's Sons Co.
MIAMI, Southern States Iron Roofing Co.
MILWAUKEE, J. D. Wilson Co.
MINNEAPOLIS, Asbestos Products, Inc.
MOBILE, Ala., Shook & Fletcher
NASHVILLE, Southern States Iron Roofing Co.
NEWARK, N. J., Eastern Steam Specialty Co.
NEW HAVEN, Conn., Insulation Supply Co.
NEW ORLEANS, Eagle Asbestos & Packing
NEW YORK, Eastern Steam Specialty Co.
OKLAHOMA CITY, Ball Distributing & Engineering Co.
OMAHA, Cardinal Supply & Mfg. Co.
PHILADELPHIA, John F. Scanlan, Inc.
PITTSBURGH, Dravo Corp.
PHOENIX, Ariz., Kircher Asbestos & Rubber Co.
RALEIGH, N. C., Southern States Iron Roofing Co.
RICHMOND, Va., Southern States Iron Roofing Co.
ROCKFORD, Ill., Mott Brothers Co.
SALT LAKE CITY, Bullough Asbestos Supply Co.
SAN ANTONIO, The Bracken Co.
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TULSA, Okla., Ball Distributing & Engr. Co.
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WASHINGTON, Walter E. Campbell Co., Inc.
WICHITA, Jamar-Olmen Construction Co.
VANCOUVER, B. C., Fleck Brothers Limited

EVERYONE can get SNAP*ON!

SNAP*ON . . . THE ONE AND ONLY ONE-PIECE MOLDED PIPE INSULATION OF FINE GLASS FIBERS

Sensational demand has kept Snap*On in short supply ever since its introduction several years ago — but now *everyone* can get Snap*On! To meet the ever-growing demand for this new lightweight insulation that "just snaps on the pipe," we recently made a substantial addition to its production facilities to increase Snap*On production by 150%. These new facilities are turning out the same beautifully uniform one-piece sections that have won such amazing acceptance throughout industry. Here, in a nutshell, is why Snap*On is the *standard specification* in so many industries:

Highest thermal efficiency of any pipe insulating material on the market in its temperature range.

Lower applied cost — just spread the single seam and it snaps on the pipe.

Extremely light weight. . . virtually immune to damage or breakage . . . permanent as glass itself.

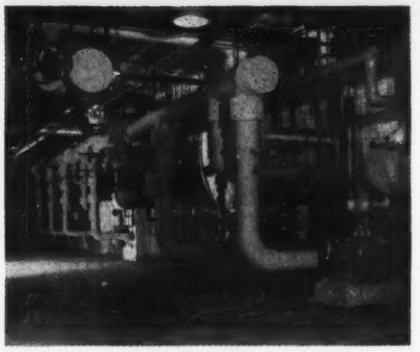
So figure Snap*On in all your plans for dual-temperature, cold or heated piping where temperatures do not exceed 350° F. Whether on straight runs, on nested or tracer lines, or at flanges, valves and fittings, Snap*On's flexibility will save you time and money. It's available *now* . . . in sizes from ½" to 33" IPS from your local Snap*On distributor. His name is listed in the column at left. Call him now or—

WRITE FOR NEW 8-PAGE SNAP*ON BROCHURE

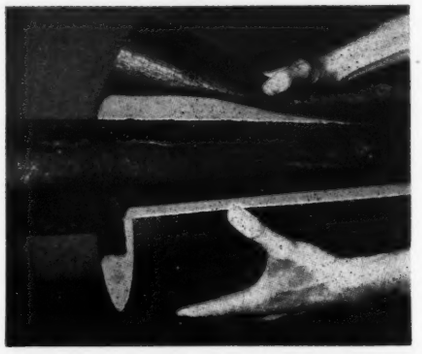
GUSTIN-BACON Manufacturing Co *Trademark Reg.

Thermal and acoustical glass fiber insulations • Pipe couplings and fittings • Molded glass fiber pipe insulation

254 W. 10th ST., KANSAS CITY, MO.



SNAP*ON . . . FOR SERVICES TO 350° F. In wall thicknesses from ¾" to 3" Snap*On is an ideal pipe insulation for industrial processing plants and for commercial and institutional buildings, both from the standpoint of initial cost and long-range heat savings. It is available plain, or canvas jacketed, in sizes from ½" to 33" IPS.



SNAP*ON . . . FOR DUAL-TEMPERATURE AND COLD PIPING. For such service, Snap*On is available with a wide variety of factory-applied jackets that solve every problem involving appearance, vapor resistance and fire resistance. All jacketed Snap*On comes in easy-to-handle, easy-to-apply 3' sections.

SNAP*ON . . . FOR BIG PIPING, INDOORS OR OUT. Just one easy spread-and-snap motion of the single seam—and 6 feet of 16" pipe is insulated! Fewer seams mean faster application, and far greater thermal efficiency. Plain Snap*On is available in these 6-ft. sections in sizes from 6"-33". For outdoor use, it can also be supplied with factory-adhered weatherproofed jackets.

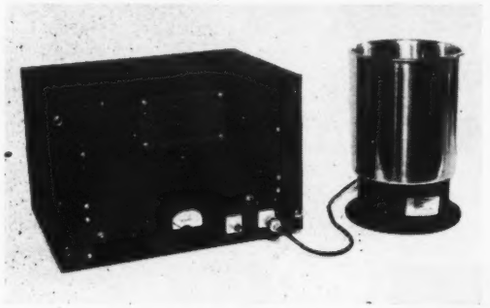
When inquiring check 1858 opposite last page

Difficult cleaning operations can be performed more easily with ultrasonic cleaner . . .

low-frequency unit handles blind hole washing, printed circuit cleaning, other operations

Uses: Cleaning small parts, removal of radioactive contamination, and other difficult cleaning operations.

Features: Low-frequency ultrasonic cleaner makes cleaning printed circuits and small parts easier.



Two tanks may be used with ultrasonic cleaner alternately, without disconnecting either one

Description: Unit consists of an electronic generator delivering up to 100 watts of energy to crystal transducers mounted on one-gallon stainless steel tank. Two cleaning tanks may be used alternately without disconnecting either one. Two different solutions may be used. Off-on switch frequency adjusting knob, and toggle switch are only controls needed for operation.

(Ultrasonic Cleaner is a product of Alcar Instruments, Inc., Dept. CP, 17 Industrial Ave., Little Ferry, N.J. . . . or for more information check 1859 on form opposite last page.)

Lists 121 metals and alloys for special tubing

Data memorandum lists 121 metals and alloys from which company produces its standard and special small diameter tubing. Analyses are conveniently grouped as carbon, alloy and stainless steels, nickel and nickel alloys, copper and copper base alloys, glass sealing alloys, reactive metals, and nickel cathode materials. A total of 63 standard analyses and 58 special analyses are listed.

Data Memorandum No. 1 is published by Superior Tube Company, Dept. CP, Germantown Ave., Norristown, Pa. When inquiring specify 1860 on form which is located opposite last page.

Tough valve buyers appreciate this kind of... Toughness

*HAYNES STELLITE

Here's why:—They know that to foil those troublesome valve "termites"—erosion, corrosion, and galling—requires built-in toughness which only seats faced with hard facing alloys AND hardened wedges can provide. Yes, it takes BOTH to do a real job and GP Valves provide both at no extra cost!

Vogt GP Valves feature the toughest and, since they are precision finished, the smoothest seating surfaces obtainable anywhere. That's why they are setting new standards of performance—longer, drop-tight service with minimum, low cost maintenance—in petroleum refineries, chemical plants, power plants and other industries. Available in a complete range of sizes from ¼" to 2" and rated 800 pounds at 850° F. and 2000 pounds at 100° F.

Advt. No. 5 in a series describing the features of Vogt GP Valves.

Write For Your FREE COPY of Supplement No. 1 to Catalog F-9. Dept. 24A-FCP.

HENRY VOGT MACHINE CO.
P. O. Box 1918—Louisville 1, Ky.

SALES OFFICES: New York, Chicago, Cleveland, Dallas, Philadelphia, St. Louis, Charleston, W. Va., Cincinnati.

Vogt GENERAL GP PURPOSE Vogt FOR BETTER VALVES

DROP FORGED STEEL

VALVES

HAYNES STELLITE—Trade-mark of Union Carbide and Carbon Corporation

When inquiring check 1861 opposite last page

Silicon carbide cement makes good refractory after air setting . . .

designed for high temp use, air-setting component melts at approximately 2750°F

Uses: As a highly refractory, air-setting cement and as a sprayed protective coating for incinerators and fire boxes.

Features: Melting point of air-setting component is approximately 2750°F, which compares favorably to the 2100-2300°F intermediate softening range of conventional air-setting cements.

Slag buildup in incinerators is low, and what little does build up can be removed easily.

Description: This is a fine-grained silicon carbide cement, size 30 mesh and finer, with a high-melting, air-setting constituent added.

For use, additional water is added until about 15% (wt) is reached. Cement is aged for 12 to 24 hr and then remixed. Cement may be sprayed or trowelled.

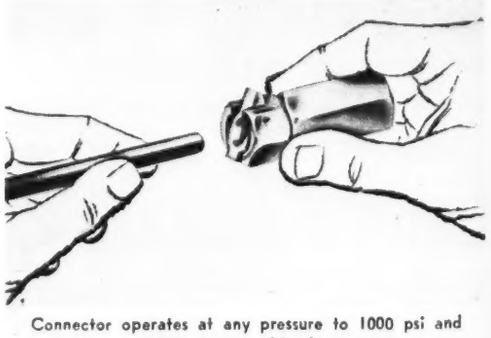
(Crystolon RC 2351 is a product of Norton Co., Dept. CP, Worcester 6, Mass. . . . or for more information check 1862 on form which is located opposite last page.)

Merely push it into position and connector holds tubing at pressure to 1000 psi . . .

permits instantaneous, leak-proof connection for pressure or vacuum

Uses: Production and maintenance applications involving pressure or vacuum testing where a fast, safe, and efficient method of attaching pressure and vacuum lines to straight end tubing is required.

Features: Connector provides an instantaneous, leak-proof connection. It will operate at any pressure up to 1000 psi and any vacuum to 25



Connector operates at any pressure to 1000 psi and any vacuum to 25 microns

for PUMPING CHEMICAL SOLUTIONS!

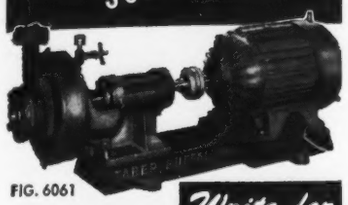


FIG. 6061

Write for TABER BULLETINS C-355 for HORIZONTAL PUMPS ... for VERTICAL PUMPS V-837

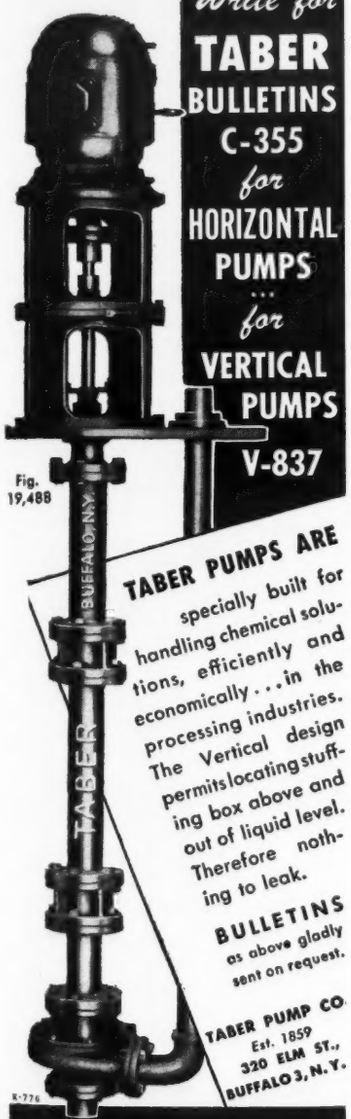


Fig. 19,488

TABER PUMPS ARE specially built for handling chemical solutions, efficiently and economically ... in the processing industries. The Vertical design permits locating stuffing box above and out of liquid level. Therefore nothing to leak.

BULLETINS as above gladly sent on request.

TABER PUMP CO. Est. 1859 320 ELM ST., BUFFALO 3, N. Y.

K-776

TABER

When inquiring check 1863 opposite last page

microns. It is merely pushed over end of tubing into "stop" position and is ready for use.

Description: Connector is available in three standard sizes: for 1/4", 5/16", and 3/8" OD tubing. It is suitable for temperatures from −40°F to +275°F and can be used for air, water, steam, oil, Freon 12, and Freon 22.

(Tube Plug and Connector is a product of Mechanical Products Corp., Dept. CP, 168 North Ogden Ave., Chicago, Ill. . . . or for more information check 1864 on form opposite last page.)

For high-temperature insulation use this molded product: it withstands 1350°F . . .

material is chemically inert, flame resistant, and insoluble in water

Uses: Industrial insulation of steam or heated process piping.

Features: Molded insulation withstands pipe temperatures up to 1350°F. Material is chemically stable, flame resistant, is insoluble in water and dimensionally stable.

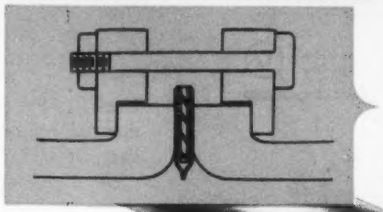
Insulation is fastened by encircling metal bands. It can be cut easily and worked with ordinary tools

Description: Product is a hydrous calcium silicate bonded with asbestos fibers. It is produced in half-cylindrical sections and segments 36" long. It can be cut easily and worked with ordinary tools. Thicknesses range from one to four inches and will accommodate pipes up to 22" in diameter. Compressive strength permits it to be laid over any shape and held tightly without breakage. Insulation is fastened by encircling metal band.

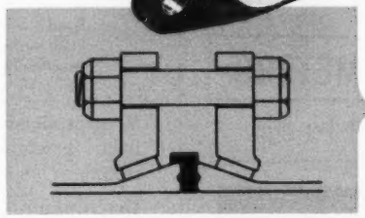
(Kaytherm high-temperature insulation is product of Keasbey & Mattison Company, Dept. CP, Ambler, Pa. Check 1865 opposite last page.)

CHEMISEAL made of du Pont TEFLON GASKETS

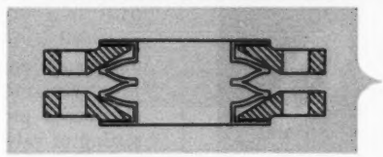
and accessories for chemical piping



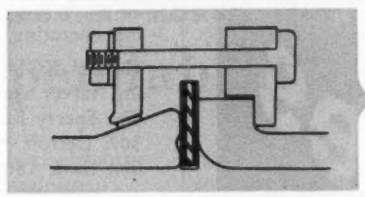
Chemiseal Jacketed Gasket, Type 1-339 WA. Compressed asbestos sandwiched between woven asbestos and enclosed in a Teflon envelope. Ideal for glass-lined steel connection. Catalog No. TG-953.



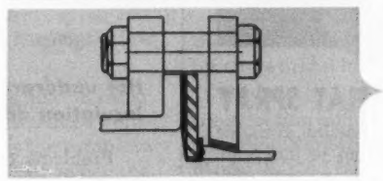
Chemiseal Snap-on Type 820 Gaskets. Molded to match contour of conical-end glass pipe, they assure perfect automatic centering of joints and free flow of medium. Made for all standard pipe sizes from 1/4 in. to 6 in. Catalog No. TG-953.



Chemiseal Expansion Joints, No. 212, and Flexible Couplings, No. 202, absorb shock and vibration, thermal expansion and contraction. Correct misalignment. Connect unlike piping ends and nozzles. Catalog No. EJ-1155.



Chemiseal Adaptors No. 2-CRS, provide a tight, safe seal between unlike piping ends and nozzles. A steel bearing ring provides rigidity. Resilient core assures safe seal at low bolt loads. Teflon Jacket protects and contains easy-to-handle single unit. Catalog No. TG-953.



Chemiseal Reducers No. 3-CRS are one piece assemblies similar to type 2-CRS, but designed to connect unlike pipe sizes with minimum length requirements. Standard sizes from 1 in. to 6 in. Bulletin No. 3-CRS.

UGS

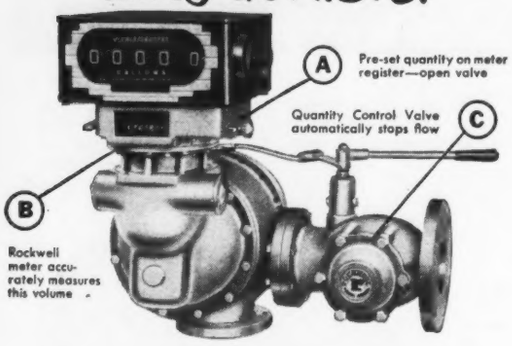
UNITED STATES GASKET CO.

CAMDEN 1, NEW JERSEY

When inquiring check 1866 opposite last page

Automatic Quantity Control

Easy as A.B.C.



Pre-set Liquid Meter Shut-off ... Without Shock

This simple, rugged Rockwell system makes *automation* available to the process industries. It's the answer to many a costly problem in batching, blending or handling piped liquids. With electrical controls you can "set it and forget it" on repetitive operations. Available in stainless steel, bronze, steel or all-iron construction. Get facts now from *Rockwell Manufacturing Company*, Pittsburgh 8, Pennsylvania. Dept. 106B

ROCKWELL Industrial METERS

When inquiring check 1867 opposite last page

FULL CONE—HOLLOW CONE—FLAT SPRAY

Spraco has the most complete line of nozzles available anywhere — **IN STOCK.** Capacities range from ⅛ pint/min. to 4000 gal./min. Bronze, cast iron, and stainless steel. Write for our nozzle catalog.

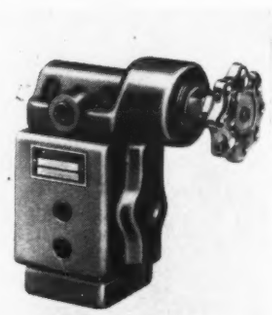
SPRAY ENGINEERING CO., 125 *Central St., Somerville 45, Mass.*

When inquiring check 1868 opposite last page

Broad pressure adjustment range provided by reducing valves for hydraulic systems . . .

units provide controlled reduced outlet pressure from 25 to 1000 psi

Uses: Pressure reducing valves are used in industrial hydraulic systems to provide, for secondary circuits, controlled maximum operating pressure. Such pressure reduction is frequently required to prevent possible damage to machinery or to a part being produced.



Reducing valves hold outlet pressure essentially constant

Features: Units feature an unusually broad pressure adjustment range, being capable of providing any controlled reduced outlet pressure from 25 to 1000 psi. Outlet pressure is maintained essentially constant, regardless of inlet pressure variations above the selected setting.

Description: Two models are available; XGL-03-B is a gasket mounted design; XTL-03-B is provided with ⅜-in pipe thread connections. Both models are nominally rated at 8-gpm flow capacity. Free reverse flow is allowable, provided pressure at reduced pressure port does not exceed pressure setting of valve. The control flow is approximately 35 cu in/min. Valves can be used in systems having operating pressures up to 2000 psi.

(Model XGL-03-B and XTL-03-B pressure reducing valves are products of Vickers Inc., Div. of The Sperry Rand Corporation, Dept. CP, PO Box 302, Detroit 32, Mich. . . . or for more information check 1869 on form opposite last page.)

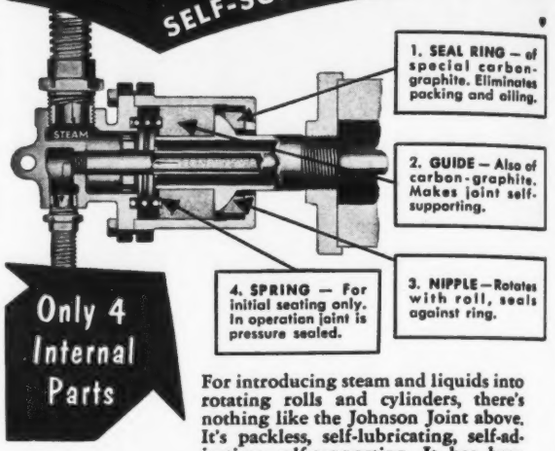
Hot underground pipe insulation data

Problems of underground pipe insulation and use of company's product are described in four-page bulletin. On-the-job photographs show ease of product application. Brief technical data are included.

"The Answer to All-Around Protection for Hot Buried Piping" is issued by American Gilsonite Company, Dept. CP, 134 W. Broadway, Salt Lake City 1, Utah. When inquiring specify 1870 on form opposite last page.

JOHNSON Rotary Pressure JOINT

SELF-SUPPORTING TYPE


STEAM
1. SEAL RING — of special carbon-graphite. Eliminates packing and oiling.
2. GUIDE — Also of carbon-graphite. Makes joint self-supporting.
3. NIPPLE — Rotates with roll, seals against ring.
4. SPRING — For initial seating only. In operation joint is pressure sealed.

Only 4 Internal Parts

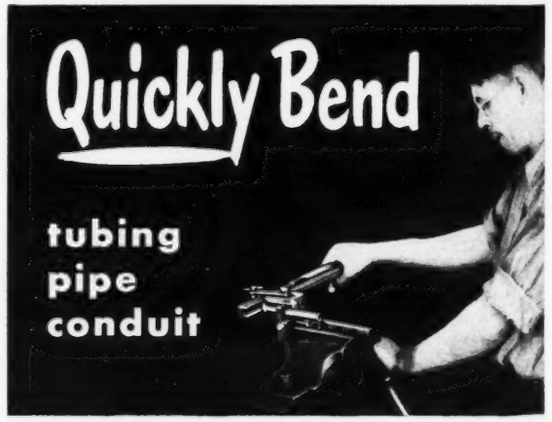
For introducing steam and liquids into rotating rolls and cylinders, there's nothing like the Johnson Joint above. It's packless, self-lubricating, self-adjusting, self-supporting. It has been adopted by dozens of machinery makers, and is finding new uses every day.

Type SB shown handles both steam and condensate through same head; also available for through flow service, and in sizes and styles for all operating conditions. ***Write for literature.***

The Johnson Corporation

826 Wood St., Three Rivers, Mich.

When inquiring check 1871 opposite last page



... with a Greenlee Hand Bender

Forming small-radius bends without flattening or kinks is simple, speedy work with a GREENLEE Hand Bender. Lets you "custom tailor" your pipe, tubing, and conduit installations right on the job. Especially designed to form neat bends for sharp corners, nooks and other close quarters. Various models and sizes. Write for free Bender Book.

GREENLEE

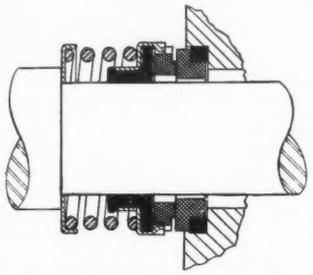
GREENLEE TOOL CO., 2382 HERBERT AVE., ROCKFORD, ILL.

When inquiring check 1872 opposite last page

Replaces packing seals without changing worn shaft

Uses: As a seal on liquid pumps and compressors including liquids containing grit or other abrasive particles.

Features: Grommet seal permits replacement of defective packing-type seals without changing worn shaft. Hydraulic balance permits high liquid pressure.



Seal is adjustable to any lengths with broad axial tolerances

Description: Units are available in six standard sizes, 3/8 through 1", adjustable to any length with broad axial tolerances. Metal components and mating face materials can vary to suit needs.

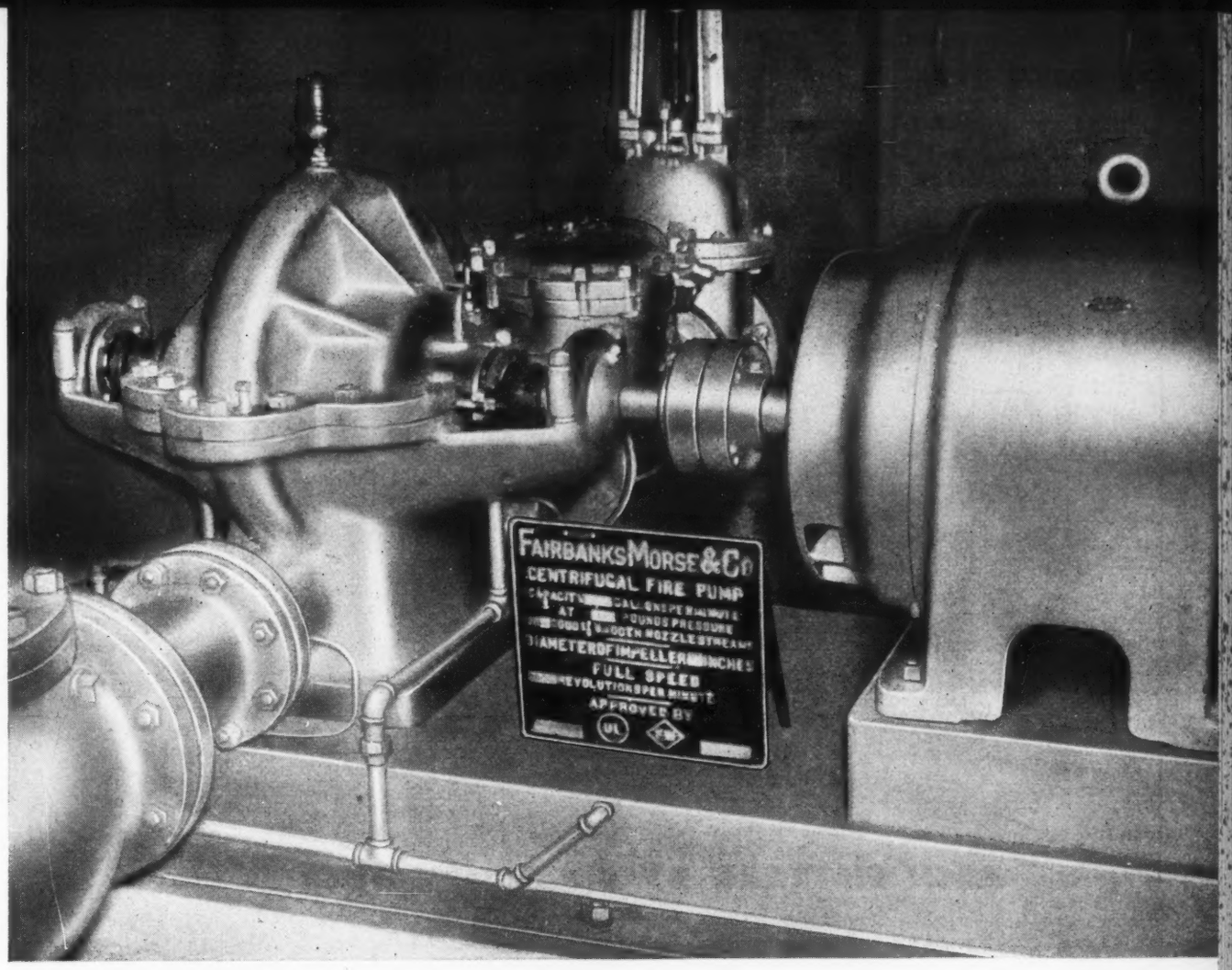
(Grommet seal, 4000 Series, is a product of Cartriseal Corporation, Dept. CP, 3515 Touhy Ave., Lincolnwood, Ill. Check 1873 opposite last page.)

Tells about refractories

Bulletin of four pages illustrates and describes electrocast refractories for use in pug mill drums, coke chutes, hot blast mains, cyclone dust collectors, and pneumatic conveyor lines.

"Toughest for Abrasion" is issued by Corhart Refractories Company, Inc., Dept. CP, 1600 W. Lee St., Louisville 10, Ky. Specify 1874 opposite last page.

For more information on product at right, specify 1875 . . . see information request blank opposite last page.



YOU CAN RELY ON YOUR FAIRBANKS-MORSE FIELD ENGINEER . . .

For Double Dependability in Fire Pumps

Plant fire protection your problem? Call in your Fairbanks-Morse Field Engineer. He's more than a salesman . . . he's an expert in solving pumping problems . . . gives you *double* dependability in the selection of the right fire pump to fit your needs.

FIRST, because he knows pumps and is also familiar with the standards established by your insurance company, he will fit the pump to your job. He has the complete Fairbanks-Morse line to back him up . . . can select the exact pump that will assure the dependability and capacity your plant needs.

SECOND, he has FAIRBANKS-MORSE pumps . . . the most efficient, dependable pumps in the field . . . made by the world's largest manufacturer of pumps.

Why not be sure of the fire pumps you buy by relying on the selection and application assistance of your F-M Field Engineer. For complete details, mail the coupon. Fairbanks, Morse & Co., 600 So. Michigan Ave., Chicago 5, Ill.

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a name worth remembering when you want the best

PUMPS • SCALES • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY
RAIL CARS • HOME WATER SERVICE EQUIPMENT • MOWERS • MAGNETOS

FAIRBANKS, MORSE & CO.
Dept. CP-2
600 So. Michigan Ave.
Chicago 5, Illinois

Gentlemen:

☐ I would like to have a Field Engineer review my fire pump problems.
☐ Send me informative literature on Fairbanks-Morse Fire Pumps.

Name_____

Company_____

Address_____

City_____ Zone_____ State_____

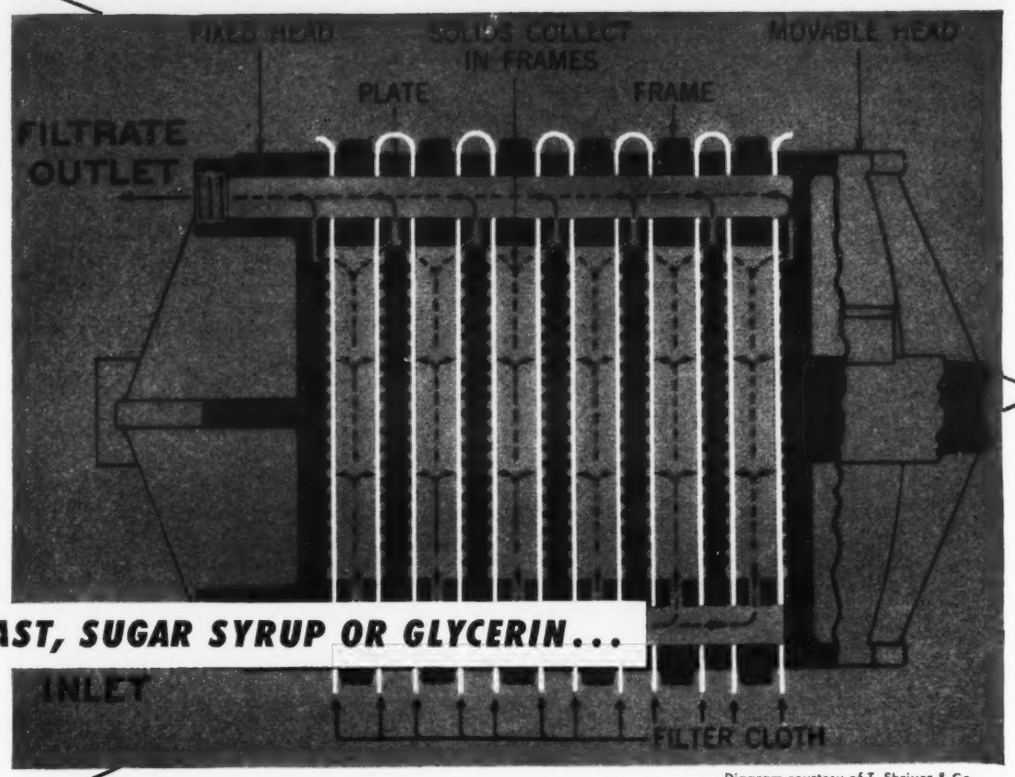


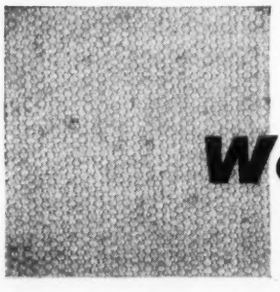
Diagram courtesy of T. Shriver & Co.

EACH FILTERED BY A COTTON DUCK

Three cases show how one basic type of fabric can be varied to do different jobs. A close, firm-textured cotton duck is used by a yeast manufacturer to retain very finely divided yeast particles. A cotton duck specially constructed to yield high rate of flow is used by beet sugar processors to clarify thick juices at 90° to 95° C. And a closely woven cotton duck is used by leading soap manufacturers to filter foreign matter from oil and glycerin.

In each example, a specially constructed cotton duck was engineered (by Wellington Sears) for a specific job, to solve a specific filtration problem. And each case points up the importance of consulting with filter fabric specialists when you are selecting a medium, because they *know* what various fabrics and fibers can do—they know, for instance, how just a slight change in yarn, count or any one of many variables, will affect a fabric's filtration qualities.

The filter fabric specialists who distribute Wellington Sears fabrics place at your disposal their knowledge and experience—and ours. If you have a difficult filtration problem that could conceivably be solved by a filter using one of our cotton or synthetic fabrics, call now. And for free copy of "Filter Fabric Facts," write Department M-1.



WEST POINT 44 TEXTILES
WEST POINT MANUFACTURING CO

Wellington Sears

FIRST In Fabrics For Industry

Wellington Sears Company,
65 Worth Street, New York 13, N. Y.

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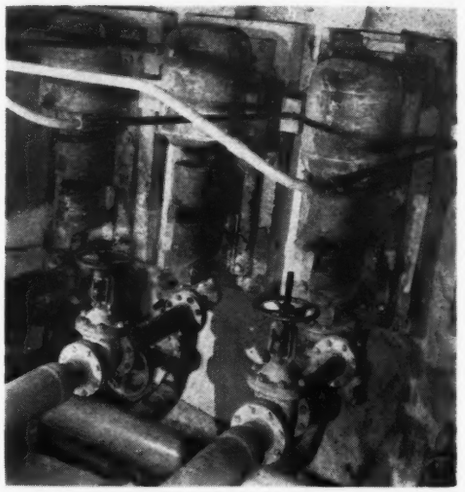
When inquiring check 1876 opposite last page

Eductor vanes on impellers reduce pump's stuffing box and sleeve wear, enable units to serve more than five years . . .

pumping ground glass and



Pumps boost abrasive solution 60 feet to grinding machines. Units have operated continuously five years

Problem: Pumps at a large glass manufacturing plant in the Midwest had to handle a liquid grinding compound containing ground glass and sand. Abrasive mixture, if lodged between packing and shaft sleeve, caused rapid wear of shaft sleeves, making constant machining and frequent replacement necessary.

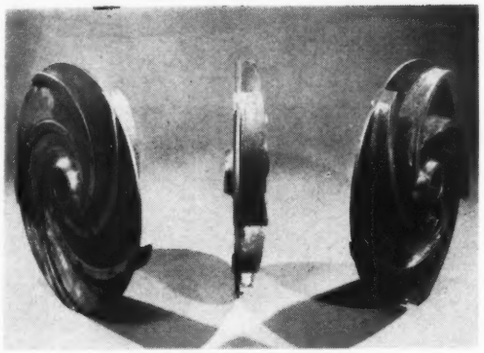
Liquid is taken from storage tanks and pumped 60 ft straight up and over to grinding machines. Since stuffing box is on discharge side of impeller on end-suction pump used, it was subject to pressure developed by pump internally in addition to suction pressure.

Solution: In 1951 company installed four end-suction, centrifugal pumps with impellers equipped with eductor vanes. Three units are in use continuously, while fourth acts as an alternate.

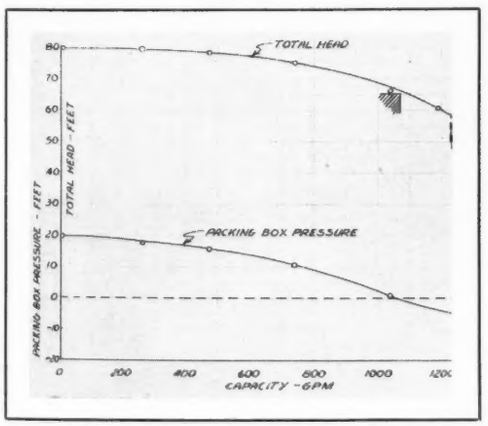
Vanes are located at back of impellers and follow general contour of actual pumping vanes. Their tips advance slightly ahead of pumping vanes. The slight advance makes pressure developed on back of impeller rim equal to or greater than pressure developed by pumping vanes, thus setting up an effective barrier to action of discharge pressure on stuffing box.

Vanes themselves have a pumping action in that

glass and sand slurry



Eductor vanes are located at back of impeller and follow general contour of actual pumping vanes



Graph shows relation of stuffing box pressure to head developed by pump

they create a low-pressure area at impeller hub and stuffing box, and a high-pressure area at periphery.

Results: Pumps have been in continuous operation, 24 hours a day, 7 days a week, since 1951. They have required only routine maintenance and practically no repairs. Pressure at stuffing box is a fraction of discharge pressure so there is increased packing, shaft, and sleeve life, and less heat dissipated in stuffing box.

(Pumps with eductor vanes on impeller were supplied by De Laval Steam Turbine Co., Dept. CP, Trenton, N.J. Check 1877 opposite last page.)

In JENKINS *Monel-seated Bronze Gates*

THE WEDGE TAKES THE WEAR - *and spares the rings*

Easy replacement of the wedge only — right on the line — restores full efficiency

THE MONEL SEAT RINGS are expanded into the body to assure a positive, leak-proof joint. Exhaustive tests in typical monel-seated gate valve services show that this permanent all-around support of the rings is essential to guard against deforming, loosening, or shifting.

THE RENEWABLE WEDGE (bronze or nickel alloy) has excellent wear resistance, but has a lower degree of hardness than the heat-treated Monel rings, which have optimum resistance to erosion and corrosion as well as abrasion. Thus, wear of the wedge leaves the rings relatively unaffected. When necessary to renew the wedge, you simply remove the valve bonnet, slip the old wedge off the stem, and slip on a new one.

GET PRACTICAL, LOW-COST RENEWABILITY in the valves you choose for the tough, punishing services that require Monel-seated gates. Compare . . . there is nothing simpler, faster, or more economical than Jenkins replaceable wedge design — and you also get the *plus* of Jenkins *extra value* in every other feature. Jenkins Bros., 100 Park Ave., New York 17, New York.

MADE WITH BRONZE OR NICKEL ALLOY WEDGE

The bronze wedge provides lasting economy for most applications. The nickel alloy wedge provides extra resistance where rapid wear and corrosion are factors.

JENKINS BRONZE GATES WITH MONEL SEAT RINGS

200 psi	300 psi
Fig. 270-U, Bronze Wedge	Fig. 280-U, Bronze Wedge
Fig. 270-UN, Nickel Alloy Wedge	Fig. 280-UN, Nickel Alloy Wedge
Fig. 270-UL, Bronze Wedge, U.L. approved for L.P.G. Services	350 psi Fig. 280-UX, Bronze Wedge

JENKINS BRONZE GATES INCLUDE 40 DIFFERENT PATTERNS

125 • 150 • 200 • 300 • 350 psi SOLID WEDGE • SPLIT WEDGE
SCREWED • FLANGED • SOLDER END • SOCKET END QUICK OPENING

Call your local Jenkins Valve Distributor for complete information.

JENKINS VALVES
LOOK FOR THE JENKINS DIAMOND
SINCE 1864 TRADE JENKINS MARK
Jenkins Bros.

When inquiring check 1878 opposite last page

CONSTANT SUCTION AT DUST SOURCES

SELF-CLEANING FOR CONTINUOUS OPERATION—NO MECHANICAL SHAKING

NO AUXILIARY MOTORS OR BLOWERS —THE MAIN OPERATING FAN DOES THE CLEANING

NO ABRASION OF BAGS BY THE CLEANER

SLY DYNACLONES

Salvage Mix Compounds... Keep Dunlop Plant Dust-Free

Each Banbury Mixer charging operation at Dunlop Tire & Rubber Co., Buffalo, N. Y., is vented by an individual Sly Dynaclone Dust Filter. The mix compounds given off as dust are continuously collected and returned by pneumatic conveying system for re-use. Valuable mix materials are fully utilized, resulting in important savings while maintaining Dunlop's exacting standards for its variety of products. Installed in the building monitor to conserve valuable floor space, the Dynaclones keep work areas clean and prevent the escape of dust to the outside.

Proven in use in hundreds of plants, the Dynaclone is the *first* self-cleaning, flat-bag filter produced in the United States . . . the *only* unit which operates continuously without the need for auxiliary blowers to create reverse cleaning air.

WRITE FOR FREE DYNACLONE BOOKLET.

Designers and Manufacturers of: Dust Control Systems, Industrial Ovens, Blast Cleaning Equipment, Tumbling Mills.

THE W. W. SLY MANUFACTURING CO.

SINCE 1874

4754 TRAIN AVENUE • CLEVELAND 1, OHIO

OFFICES IN PRINCIPAL CITIES

When inquiring check 1879 opposite last page

engineering and maintenance

When cost of conventional method skyrocketed, Du Pont substituted a foamed-in-place urethane to fill space between floor and sides of nine processing vessels . . .

urethane foam fills voids,

Formulation was mixed and poured into void over glass fiber blanket which provides initial support for foaming liquid

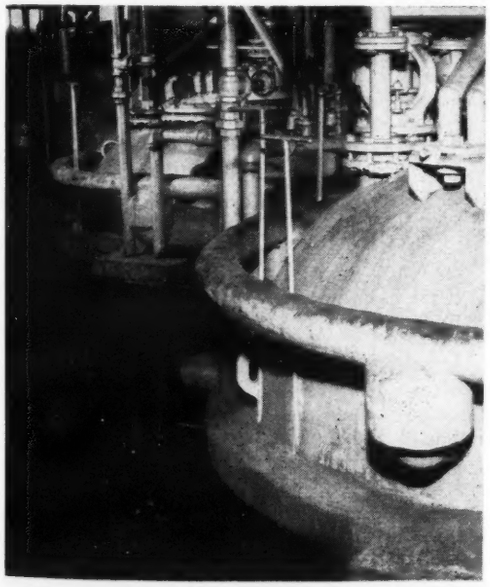
ids,

cuts costs by 50%

Problem: Costs would have been excessive if standard method were used to fill space around vessels in a new processing building at E. I. Du Pont's Chamber Works, Deepwater Point, N.J. To meet operating demands, it became necessary to start up process before laggers could install flashing around nine kettles. Burning or welding could not be done during regular working shifts because of nature of materials being processed. Flashing could only be installed during week-ends or during a complete shutdown, thereby increasing costs to a point where an alternate method was sought.

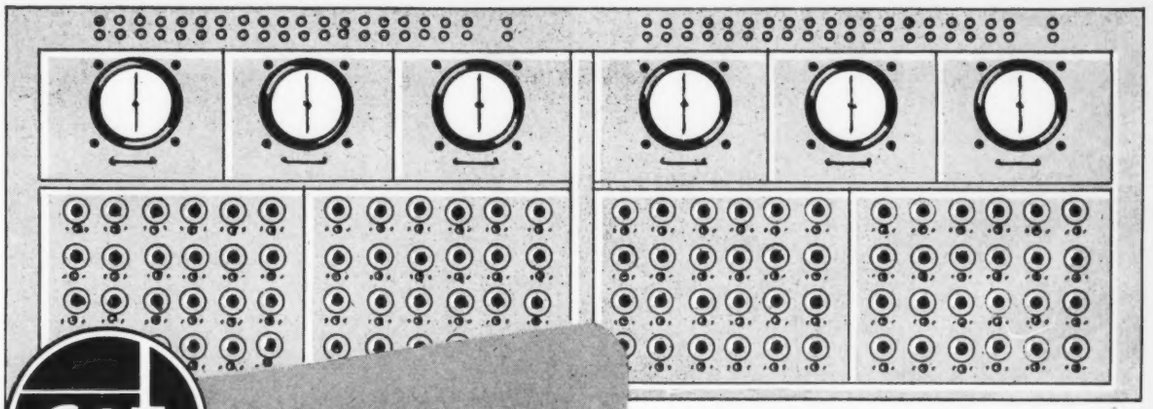
Processing vessels extend vertically through floor. Floor slab is built with a curbed opening slightly larger than vessel diameter. Space between vessel shell and curb of floor needed to be filled for following reasons: 1) To prevent splashing from

(Please turn to next page)



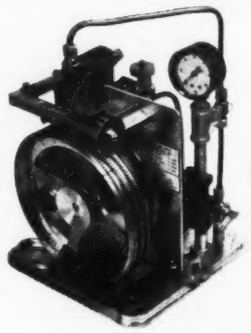
Three of nine processing vessels where foamed-in-place urethane was used to fill void between vessel and floor

AUTOMATION - MINDED?



Got ®

AUTOMATIC FLOW CONTROLS

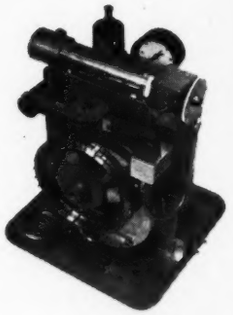


Type "M-2" Controller. Regulates motor valve cycles on time, pressure or combination time-pressure basis. Frequency and duration of timed cycles may be regulated easily without taking the unit out of operation.

This is for you if your operations include automatic control of liquid or gas flow. For many years a major supplier to the oil industry, Garrett Oil Tools now offers a complete line of industrial motor valves and controllers for general plant usage.

Featuring designs that have proved successful under the most rigid and demanding conditions, these valves and controllers provide advanced methods of flow control, and will fill many needs in your operations. A great variety of types and sizes is available, with body materials and trim furnished to meet specified requirements. Most are completely new to general industry, and may offer economical solutions to problems that have existed for many years.

For detailed information, write for Catalog No. 256 MVC.



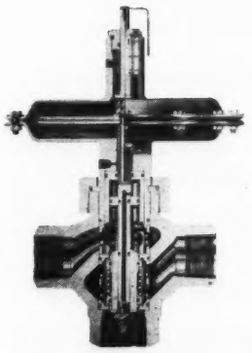
Type "C" Controller. Regulates valve cycles on time, pressure or combination time-pressure basis. Available also in types to provide pressure-controlled cycling, high-to-open and low-to-close, or low-to-open and high-to-close.

Garrett Oil Tools, Inc.

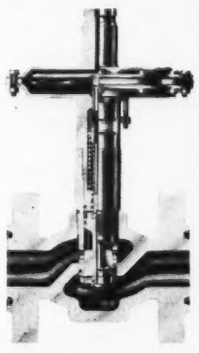
P. O. BOX 2427 • LONGVIEW, TEXAS

USI

DIVISION OF U. S. INDUSTRIES, INC



Type "CPC" Valve. Three-way, three position, center position closed. Inner valves and all other parts accessible without removing valve body from the line.



Type "DCB-2" Valve. Fully pressure balanced, with guaranteed bubble-tight closure against gas or liquid. Interchangeable soft or hard seats, in air-to-open or air-to-close types.

When inquiring check 1880 opposite last page

CRISS CROSS
BRAIDED PACKING

stronger—won't ravel, wear through, slough off—gives long service life

For Standard Services
"BELMONT"
asbestos • copper-asbestos • flax

In Crisscross braid, the strands crisscross from the surface diagonally through the body of the packing, each strand becoming an integral part of the stronger structure. Lubrication is locked in. Controlled porosity is obtained. Seals are accomplished with less gland pressure. Packing life is longer.

For All-Chemical Service
"BELMONT"
TEFLON Packings

The only positively corrosion-resistant Compression type packing available to industry today. Pure TEFLON—it is impervious to *all* chemicals except molten alkali metals, fluorine at elevated temperatures and chlorine trichloride.

Available in three types—TEFLON filament, "dragon fur", and blue or white asbestos treated with TEFLON suspensoid.

CRISSCROSS Braid gives mechanical strength and resilience to match chemical resistance. Extremely antihesive, TEFLON requires no lubricant. Lasts for months in service where other packings fail in hours. Ask your BELMONT Packing Distributor or write for Catalog.

Belmont Packing & Rubber Co.
Butler & Sepviva Streets
Philadelphia 37, Pennsylvania

BELMONT

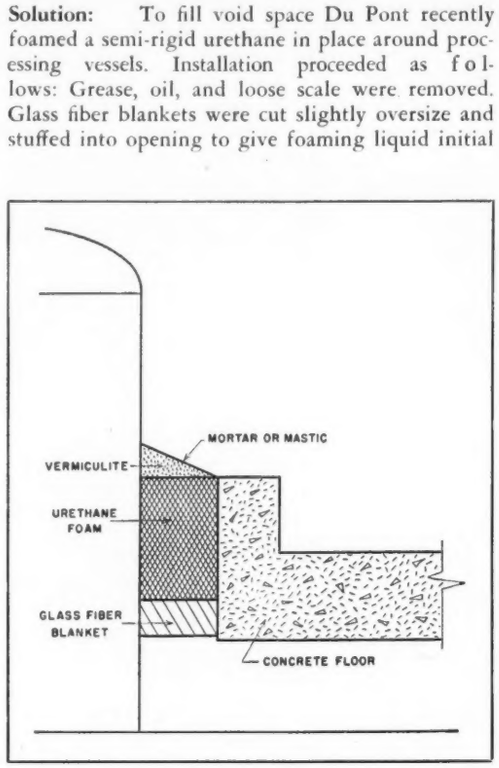
When inquiring check 1881 opposite last page

Urethane Foam

(*Continued from preceding page*)

floor washings and inadvertently spilled materials going to floor below. 2) To eliminate chimney effect of open cavity that would spread fire and fumes in an emergency. 3) To prevent accidents. If space were left open a serious source of personal injury would be present.

Solution: To fill void space Du Pont recently foamed a semi-rigid urethane in place around processing vessels. Installation proceeded as follows: Grease, oil, and loose scale were removed. Glass fiber blankets were cut slightly oversize and stuffed into opening to give foaming liquid initial



Cross section showing position of glass fiber blanket, foamed urethane, vermiculite "soft" concrete, and hard mortar finish coat

support. After the foam expands it is self-supporting. Blanket fitted into irregular surfaces and was left permanently in place.

A two-part formulation of organic isocyanates and resin was mixed, with a catalyst, in throw-away containers and poured over blanket. Blend expanded from 20 to 30 times its original volume and was completely foamed in five minutes. After 30 minutes it was ready to take moderate compressive loadings. Excessive foam was trimmed with a knife. A vermiculite "soft" concrete was used to form a sloping protective cap and a hard top finish of mortar was troweled smooth. If vibration had been severe, and asphalt mastic could have been used in place of mortar. Care was taken to prevent foam from coming in contact with eyes, skin, or gastric tract, and adequate ventilation provided at all times.

We're Interested In Your Requirements for:

- √ Pressure Vessels
- √ Storage Vessels
- √ Stacks
- √ Piping
- √ Special Weldments
- √ Field Construction

• We don't know what your present requirements are, but it's a good bet that after we've studied your blueprints and specifications, we can fabricate and erect the piping, vessels, stacks or any other steel plate products you might need.

Better get in touch with us Today!

The YOUNGSTOWN STEEL TANK COMPANY
Youngstown, Ohio

When inquiring check 1882 opposite last page

All work was done with equipment in operation, agitators were running, steam was on in the jackets, and operators attended equipment uninterrupted.

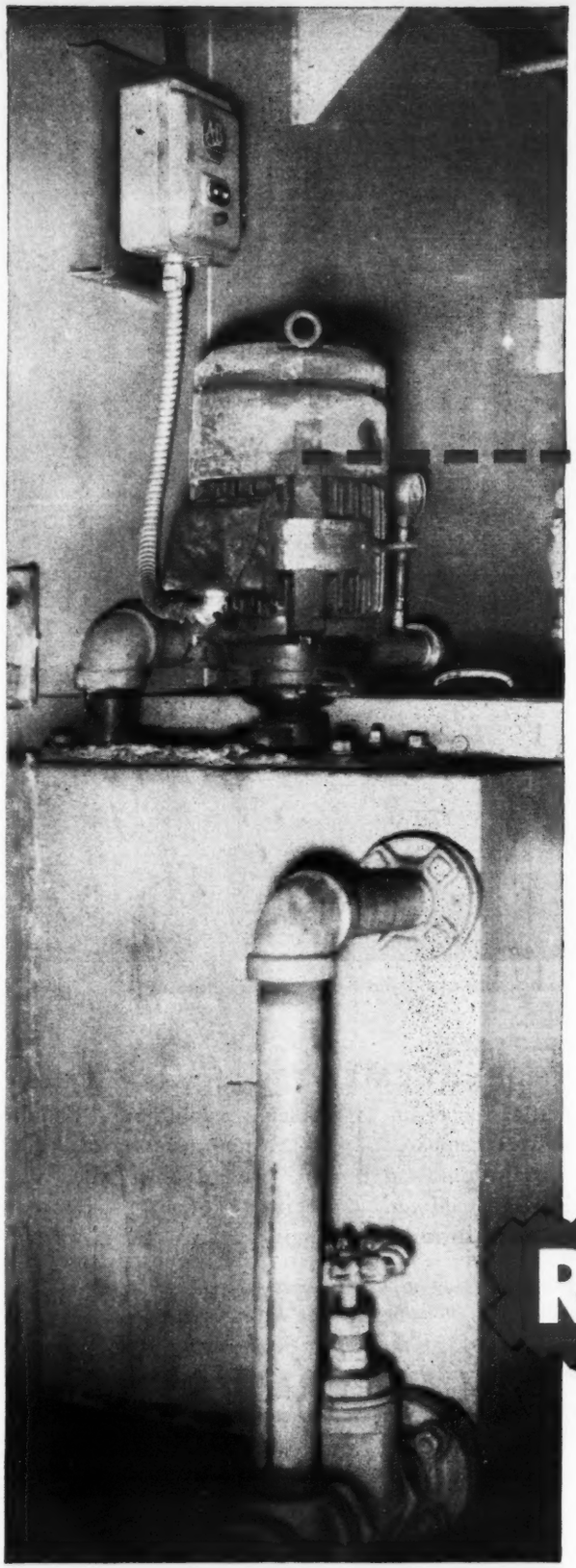
Foam used has a compressive strength of 20 to 35 psi, and a density of 2 lb/cu ft. It has a maximum surface temperature range for continuous use from −100 to +200°F; intermittant to +250°F. By varying formulations, higher load carrying capacities or temperature ranges can be achieved. Foam has low thermal conductivity, excellent adhesion to concrete and vessel, low linear thermal expansion, and immunity to flexural stress damage.

Results: Savings ranged from $100 to $200 per tank. Cost was about 50% of what it would have been if conventional flashing had been used. Where more jagged, erratic, and irregular surfaces are encountered, a greater comparative saving is realized. This method of filling voids is now standard at Chambers Works. Du Pont estimates an extended service life. Initial trial applications, installed four years ago, are still in excellent condition.

(Organic isocyanates, used in urethane formulations are supplied by Elastomer Chemicals Dept., E. I. Du Pont de Nemours & Co. (Inc.), Dept. CP, Wilmington 98, Del. . . . or for more information check 1883 on form opposite last page.)

"Right there is where our bottleneck is!"

Ken Boyea works for Hercules Powder Co. in Holyoke, Mass.



RELIANCE solves motor corrosion problem

This Reliance Corrosion-Proof Motor is operating a pump which circulates cleaning solution through a tank containing metal parts. The motor is subjected to corrosive vapors and liquids each time a basket of parts is removed. BUT THIS MOTOR WILL NOT CORRODE.

The solid cast-iron housing, including the fan cover, will withstand corrosive service indefinitely. Wiring identification is preserved on a stainless steel name plate. A threaded outlet is provided on the water tight conduit box, and motor leads are molded into a neoprene gasket that completely seals off the windings from the conduit box. A neoprene or non-ferrous shaft slinger seals the only other frame opening.

These and many other features give you a motor with a built-in corrosion protection. Why not install this superior design now and save many replacement dollars in the years ahead.

Write for bulletin B-2406 for complete design details.

B-1834

R

RELIANCE ELECTRIC AND ENGINEERING CO.

DEPT. 142A, CLEVELAND 10, OHIO

CANADIAN DIVISION: WELLAND, ONTARIO

Sales Offices and Distributors in Principal Cities

When inquiring check 1884 opposite last page

this "Buffalo" pump moves your acids on rubber

"Buffalo" Rubber-Lined Pump with upper half of casing removed.

—REDUCING COSTLY DOWN-TIME
—ELIMINATING EXCESSIVE REPLACEMENTS

If you are pumping highly corrosive liquids, or liquors containing abrasive solids, you may be paying the high price of short pump life. However, where such severe service destroys ordinary pumps in a hurry, "Buffalo" has the answer: what acids can't touch, they can't hurt. And in this "Buffalo" Pump, the liquid contacts nothing but rubber, vulcanized to the impeller and passages.

Pump life is multiplied many times and the cost of rubber lining is negligible when compared to the savings in down-time and replacements. Have us mail you information on your particular problem. Remember, Buffalo "Q" Factor* features save you money and troubles when you specify "Buffalo" Chemical Pumps.

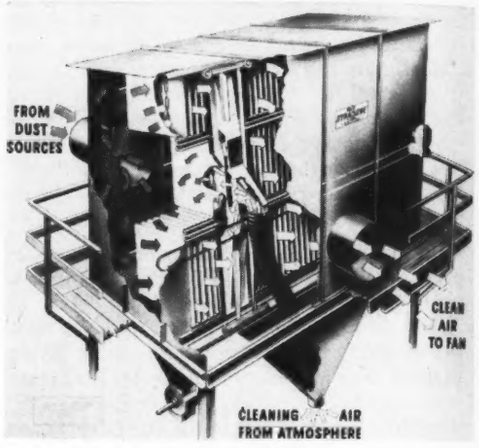
**The "Q" Factor — the built-in Quality which provides trouble-free satisfaction and long life.*

"Buffalo" PUMPS

BUFFALO PUMPS
DIVISION OF BUFFALO FORGE COMPANY
524 BROADWAY • BUFFALO, N.Y.
Canada Pumps, Ltd., Kitchener, Ont.
Sales Representatives in all Principal Cities

A BETTER CENTRIFUGAL PUMP FOR EVERY LIQUID

When inquiring check 1885 opposite last page



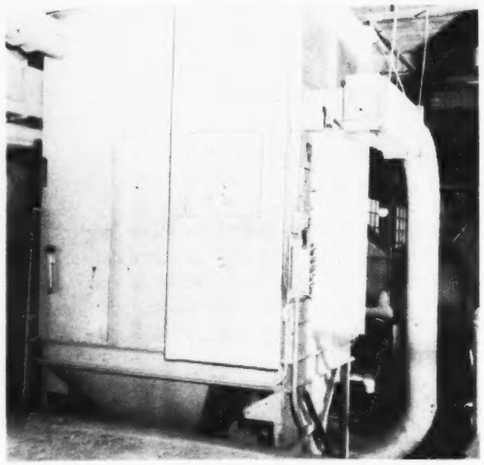
Continuous dust removal by back flow of air means uniform suction through filter bags

End soybean dust nuisance at Spencer Kellogg with cloth filter . . .

THEODORE W. WETT, Assistant Editor
With **JOHN DE LANE,** Works Manager
Spencer Kellogg & Sons, Inc.
Decatur, Illinois

Problem: Dust from soybean hulls, up to 400 lb a day, presented a serious nuisance at Spencer Kellogg. Although centrifugal collection of 10 to 12 tons processed each day was 98% efficient, 2% not collected represented loss of final product in addition to dust nuisance.

Soybeans are dehulled to reduce their bulk and thereby increase basket capacity in extraction step. Beans are passed through cracking rolls, sized to break off the hull and crack the bean. Hulls, with a density of about 6 lb/cu ft, are drawn off by suction and collected to recombine with the extracted flake stream, ending up in 44% meal used for animal feed. Cracked beans pass through flaking rolls where they are compressed into wafer thin flakes with a density of 20 lb/cu ft, then processed to extract soybean oil.



After the push of a button to start, collector runs continuously, needs no periodic cleaning

back flow of air removes accumulated material to keep suction constant

Solution: In 1950 Spencer installed a continuous cloth flat-bag collector for soybean hulls. Collector applies constant flow of reverse air by means of a traveler to prevent accumulation of dust on cloth bags. Suction at dust source remains uniform.

Fan creates a suction in entire system, from dust source through dust chamber and filter bags, and into clean air chamber. Traveler blocks off five filter bags at a time in each tier. Outside air flows in reverse direction through center bag loosening dust which is free to drop into hopper since bags on either side are not under suction.

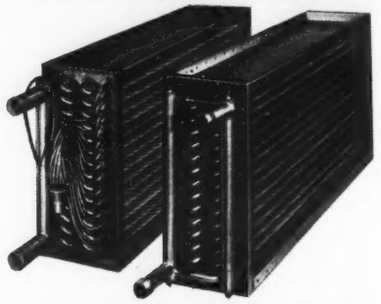
Results: Hull collection is now 100% efficient, dust problem has been eliminated, and all material is recovered. Collector has operated continuously, except for plant shutdowns, since installed in 1950. Only normal maintenance has been necessary.

(Dynaclone collector is a product of W. W. Sly Manufacturing Co., Dept. CP, 4700 Train Avenue, Cleveland, Ohio . . . or for more information check 1886 on the convenient Reader Service slip opposite last page.)

MARLO HEAT TRANSFER EQUIPMENT

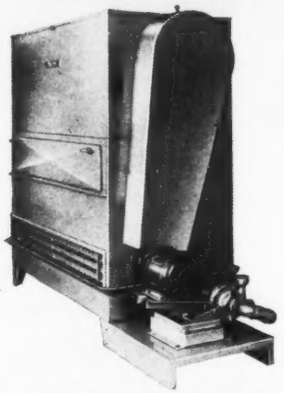
NOW AVAILABLE IN STAINLESS STEEL TO YOUR SPECIFICATIONS

HEATING and COOLING COILS



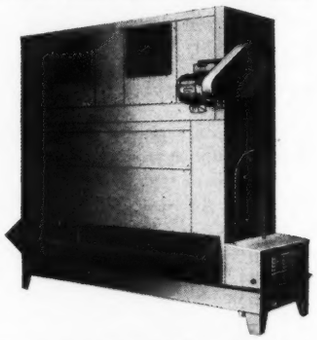
Stainless—Continuous plate type with staggered tubes and smooth drawn ferrules pressure-expanded to produce a highly effective positive mechanical and thermal bond between tube and fin. Also available with copper and aluminum tubes and fins in any combination.

COOLING TOWERS



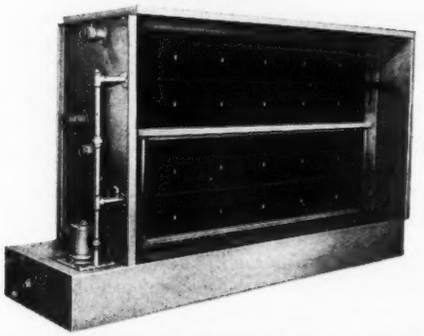
Stainless—2—150 tons. Suitable for indoor or outdoor location. Quiet operating.

EVAPORATIVE CONDENSERS



Stainless—3—150 tons. Suitable for indoor or outdoor location. Quiet operating. All prime surface condensing coil.

AIR WASHERS



Stainless—Compact and sectional in construction, for quick, easy erection. Available in many standard sizes, also custom designed for special applications.

For More Complete Information, Send Coupon Attached to Your Letterhead.

MARLO

coil co.

SAINT LOUIS 10, MISSOURI

Quality Air Conditioning and Heat Transfer Equipment Since 1925

MARLO COIL COMPANY

6133 Manchester Ave., St. Louis 10, Mo.

Please send me complete information on the following stainless steel Marlo heat transfer equipment.

☐ Heating and Cooling Coils ☐ Cooling Towers

☐ Evaporative Condensers ☐ Air Washers

NAME_____

COMPANY_____

ADDRESS_____

CITY_____ ZONE____ STATE_____

When inquiring check 1887 opposite last page

In which of
these 5 areas
is corrosion **costing**
you too much money?

1 **Vessels that wear out too soon?**

2 **Processes that contaminate your product, reduce yield or corrode equipment quickly?**

3 **Heat exchangers that cost too much for service rendered?**

4 **Pipelines and valves that can't take hot or cold corrosives long?**

5 **Fumes which attack and destroy ducts or stacks fast?**

If you have problems in these or related areas, Pfaudler's 72 years in the field of corrosioneering can help you minimize them.

Pfaudler engineers and fabricates corrosion resistant equipment built of glassed steel (resistant to both acids and alkalies), stainless steel, Hastelloy, titanium, nickel, copper, aluminum, etc. Our applications engineers recommend combination of materials that give you the best return on your investment.

And our project engineers can help you develop *processes* that will give you the end results you want with a minimum of corrosion.

We suggest you send for our 1956 Buyer's Guide which explains in more detail how you can reduce corrosion costs.

THE PFAUDLER CO.
Rochester 3, New York
SPECIALISTS IN CORROSIONEERING

When inquiring check 1888 opposite last page

new literature

Industrial bulletins pertinent to the reader . . . offering data on products, processes, services. Additional reviews of catalogs, bulletins, data sheets, etc, are found throughout other sections of the magazine

Many uses of high-speed homogenizer-mixer shown

Wide-range chemical processing operations of high-speed, high-shear homogenizer-mixer are described and illustrated in eight-page catalog. Suggested uses include blending and homogenizing of paints, pharmaceuticals, cosmetics, heavy chemicals, plastics, inks and paper products. Drawings illustrate internal construction and operation of various models. Photographs show laboratory and production models.

Cat 402-R-2 is issued by Gifford-Wood Co., Dept. CP, Graybar Building, New York, N. Y. When inquiring specify 1889 on form opposite last page.

Catalog rates gloves' resistance to chemicals and solvents

Sixteen-page catalog has chart showing resistance ratings of rubber, latex, neoprene, Buna-N, and plastic gloves to 199 chemicals and solvents. Description of company's line of gloves and finger cots contains colored illustrations and section on "how to select".

"Wilson Industrial Glove Catalog" is issued by Industrial Division, The Wilson Rubber Company, a division of Becton, Dickinson and Company, Dept. CP, 1200 Garfield Ave., S.W., Canton 6, Ohio. When inquiring specify 1890 on form opposite last page.

Formulas for solvent-thinned and water-thinned paints

Twenty-four formulas for solvent-thinned paints and 17 formulas for water-thinned paints are featured in 46-page booklet. Each formula sheet is three-hole punched so it can be removed and placed in a binder. Celite diatomaceous silica is defined, and the extra dividends it offers are pointed out.

"Pigment Extenders, Flatting Agents, Filter Aids for the Finishes Industry" is issued by Johns-Manville, Dept. CP, 22 East 40th St., New York 16, N.Y. When inquiring specify 1891 on the convenient Reader Service slip opposite last page.

Shows combustible gas detection equipment

Illustrated specification sheet tells about portable alarm unit for gas detection. Exploratory unit used in testing for gas from outside a confined danger area is also described. Detailed operational and construction data, and application suggestions are given.

"J-W Sentinel Portable, Audible Combustible Gas Alarm" is issued by Johnson-Williams, Inc., Dept. CP, Box 6, Station A, Palo Alto, Calif. When inquiring specify 1892 on form opp. last page.

Industrial layout models — cost reduction featured

Bulletin of eight pages shows and discusses layout models of factories, warehouses, offices, machine shops, etc. Information is contained on models scaled 1/8, 3/16, 1/4, and 1/2" to the foot. Section of bulletin is devoted to pertinent questions and answers on industrial layout models. Ways to save money on construction and maintenance of models are pointed out.

"Models for the Factory Floor" is issued by Industrial Models, Inc., Dept. CP, 2311 Sconset Road, Wilmington 3, Del. When inquiring specify 1893 on form opposite last page.

Gives information on extrusion of acetate and butyrates

Methods of forming Tenite Acetate and Tenite Butyrate plastics into finished products by process of extrusion are given in this 32-page booklet. Also discussed are design and operation principles applicable to specific component parts of extrusion machinery and equipment. Included are guides for correcting problems in extrusion of sheeting, and extrusion of shapes other than sheeting.

"Extrusion of Tenite Acetate and Butyrate" is issued by Eastman Chemical Products, Inc., a subsidiary of Eastman Kodak Co., Dept. CP, Kingsport, Tenn. When inquiring check 1894 on form opposite last page.

Calculator tells delivery dates of tanks, pressure vessels

Produced on heavy-weight varnished board, handy disc-type calculator tells delivery date of tanks and pressure vessels fabricated by manufacturer. User simply sets arrow opposite date of order and gets direct reading of estimated delivery date.

Delivery Date Calculator is issued by Nooter Corporation, Dept. CP, 1420 South Second Street, St. Louis 4, Missouri. When inquiring specify 1895 on form opposite last page.

Handy chart simplifies flowmeter selection

Revised eight-page bulletin has chart for rapid selection of proper flowmeter. Full range of sizes handles capacities up to 75,000 cfh of air. Cut-away drawing illustrates construction and operation. Photographs point out several applications.

Bul SC-1022 is issued by Selas Corporation of America, Dept. CP, Dresher, Pa. When inquiring specify 1896 on form which is located opposite last page.

Manufacturers of steel containers listed in directory

Addresses of steel-shipping-container manufacturers are listed in 32-page directory. Included are product-manufacturer cross-reference tables and general information on specifications, production figures and statistics, and story of research in field of linings and coatings.

1956-1957 Directory is issued by Steel Shipping Container Institute, Dept. CP, 600 Fifth Ave., New York 20, N.Y. When inquiring specify 1897 on form opposite last page.

Saving with expendable pallets is subject of brochure

Advantages of using pallets constructed of paperboard are revealed in four-page brochure. Actual case history is cited. Range of standard sizes for capacities up to one ton are given for two types of expendable pallets.

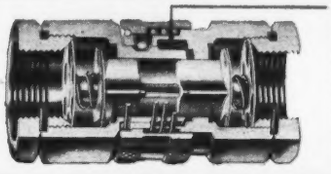
"For the 'Midas' Touch" is issued by Titan Pallet Co., Inc., Dept. CP, 527 Madison Ave., New York 22, N.Y. When inquiring specify 1898 on form opposite last page.

WHICH SNAP-TITE QUICK-CONNECT COUPLING IS BEST FOR YOU?

SNAP-TITE "H" COUPLING . . . . . FOR HIGH PRESSURE APPLICATIONS

FOR HYDRAULIC OR AIR

"H" Coupling for high strength, higher efficiency, high-resistance to heavy line surge. Sizes: ⅛" thru 12". Bulletin No. 240

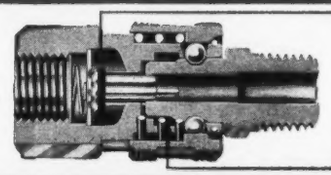


Exclusive U-packer gives a positive seal without compression set because of rubber distortion. Line pressure inside the U-packer keeps it open and forced against its metal backing—the higher the pressure, the tighter the seal.

SNAP-TITE HI-FLOW COUPLING . . . FOR LOW PRESSURE APPLICATIONS

FOR AIR AND FLUIDS UP TO 150 p.s.i.

Hi-Flow is recommended to connect small air tools to plant air system, and for low pressure fluid transfer in small lines. Sizes: ⅛" thru ¾". Bulletin No. 230

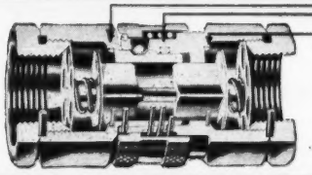


Bonded valve washer
(pat. pending on valve construction)

Exclusive U-packer

SNAP-TITE "HK" COUPLING . . . . . FOR HARD TO HANDLE FLUIDS

FOR FUMING ACIDS, ALKALIES, SOLVENTS, AND HIGH PRESSURE STEAM . . . "HK" is the only coupling now on the market for fluid temperatures from —100° F to +500° F . . . and for live steam up to 460° F. Its seals are made of Teflon for which there is no known solvent. Sizes: ½" thru 3". Bulletin No. 270



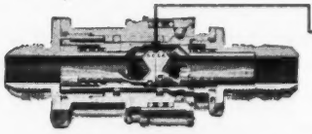
Teflon Valve Seal

Teflon Nipple Seal

Teflon Valve Seal

SNAP-TITE NO-SPILL COUPLING . . . FOR MINIMUM AIR INCLUSION

FOR AIRCRAFT, MISSILE HYDRAULIC, FUEL SYSTEMS which cannot stand air in the lines, and for transmitting fluids which *must not spill*, the Snap-Tite no-spill coupling is recommended. Bulletin No. 280

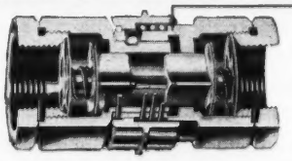


Flush valves prevent spillage, air inclusion. Snap-Tite will engineer special variations to your requirements.

SNAP-TITE "E" COUPLING . . . . . FOR VACUUM and VERY LOW PRESSURE

FOR VACUUM SYSTEMS IN THE MICRON RANGE

"E" Coupling performs in the *micron* range in the smaller sizes both connected and disconnected. Recommended, too, for gravity flow . . . U.L. approved for LP Gas. Sizes: ⅛" thru 12". Bulletin No. 250



Nipple seals in coupler by depressing the lip of the E packer and slightly compressing the body of the packer. This new E-packer gives positive seal under high-pressure, low-pressure, and vacuum.

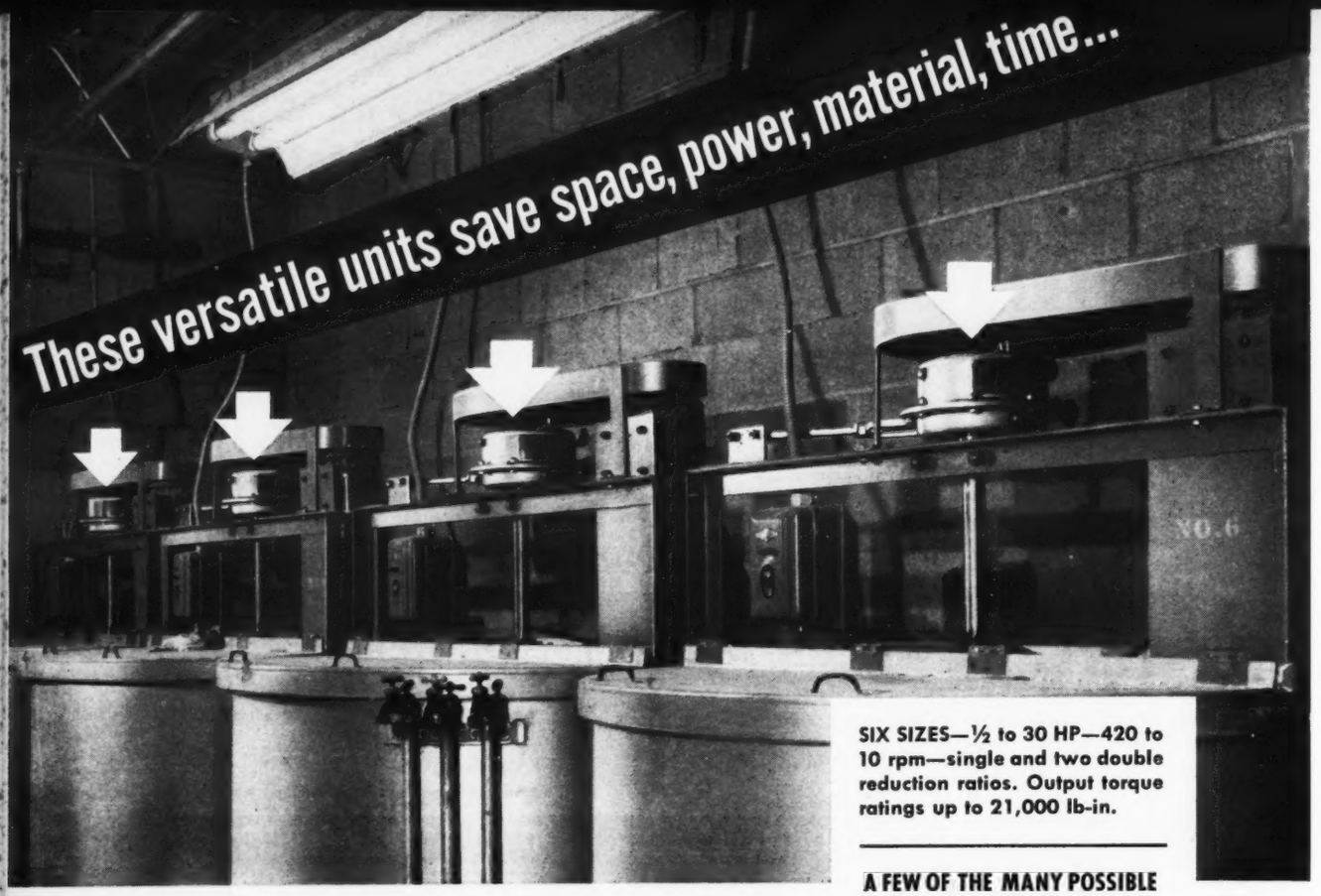
Snap-Tite Couplings are available plain, (without valves), and with either single or double shut-off. Couplings normally furnished in alloy steel, but all (except hi-flow) are also available in brass, aluminum, or stainless steel with a variety of finishes.

SNAP-TITE, INC., UNION CITY 6, PA.

Snap-Tite

SNAP-TITE COUPLINGS CAN HANDLE ALMOST ANYTHING THAT FLOWS

When inquiring check 1899 opposite last page



SIX SIZES—½ to 30 HP—420 to 10 rpm—single and two double reduction ratios. Output torque ratings up to 21,000 lb-in.

FALK ALL-STEEL Shaft Mounted Drives

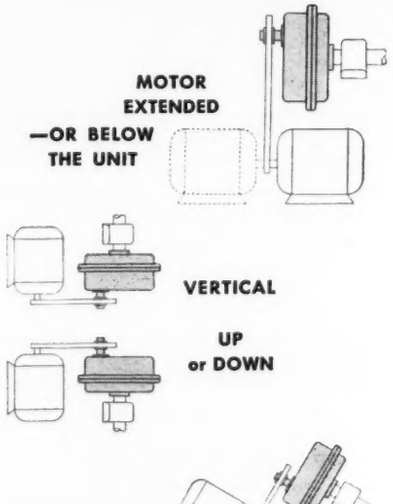
The photograph above typifies the way FALK Shaft Mounted Drives furnish the economical solution to problems of efficient speed reduction in a limited space. Within their rated capacities, these versatile reducers are designed to drive any machine and to fit any space requirement.

FALK Shaft Mounted Drives mount on the driven shafts and are connected by V-belt or chain to any convenient rotating power source. Unlimited choice of output speeds between 420 and 10 rpm is made possible by varying the ratio of driving sheaves or sprockets.

These units, with precision-cut gears of highest efficiency, use a minimum of power. They need no adjustable motor bases or slide rails; thus they save material. And, because they are readily available and easily installed or moved, they save time. Best of all, they are backed by FALK's unmatched experience in precision-gear manufacture.

Promptly available from factory and distributor stocks, from *coast to coast*. Ask your Falk Representative or Distributor for details—or write us for **Bulletin 7101.**

A FEW OF THE MANY POSSIBLE DRIVING ARRANGEMENTS



THE FALK CORPORATION, 3001 W. CANAL ST., MILWAUKEE 1, WIS.

Representatives and Distributors in Most Principal Cities

Manufacturers of

- Motoreducers
- Speed Reducers
- Flexible Couplings
- Shaft Mounted Drives
- High Speed Drives
- Special Gear Drives
- Single Helical Gears
- Herringbone Gears
- Marine Drives
- Steel Castings
- Weldments
- Contract Machining

FALK ...a good name in industry

NEW LITERATURE

Hydraulic tower operated by one man

Four-page bulletin, printed in two colors, describes maintenance tower which raises its work platform from 7′ to 17′ in 25 seconds, and telescopes to pass through low, narrow doors.

Useful for building maintenance, both indoors and outdoors, unit moves on casters with safety brakes.

Brochure gives complete specifications on three models — manually operated, 12v battery operated, and 110v plug-in unit.

"Safway Moto-Lift" is issued by Safway Steel Products, Inc., Dept. CP, 6228 W. State Street, Milwaukee 13, Wis. When inquiring specify 1900 on form opposite last page.

Brake fluid regulations

Summary of state regulations pertaining to brake fluid is offered in this 36-page compilation. It is available in a three-ring binder at $3.50 per copy plus postage from Chemical Specialties Manufacturers Assn., Dept. CP, 50 E. 41st Street, New York 17, N.Y.

Properties and uses of silicone rubbers

Two useful general-purpose silicone rubber stocks are described in this eight-page brochure, which gives properties and uses. "Silastic 50 and 80" is issued by Dow Corning Corp., Dept. CP, 592 Saginaw Rd., Midland, Mich. When inquiring check 1901 on form which is located opposite last page.

For more information on product at left, specify 1902 . . . see information request blank opposite last page.

3 WAYS
SPERRY CUSTOM FILTRATION
. . . HELPS YOU!

Experience – SPERRY OFFERS YOU the knowledge gained thru 88 years designing and constructing thousands of filter presses for hundreds of industries.

Equipment – SPERRY OFFERS YOU a complete selection of the finest filter presses, standard or special . . . all types and sizes of filter media . . . plus the widest selection of closing devices and other time-savers—for all types of industrial filtration.

Engineering – SPERRY OFFERS YOU free consultation. Our laboratory and engineering departments are always at your disposal for information regarding your filtration problems . . . without cost or obligation.

Write for Free 44 page Catalog today

D. R. SPERRY CO.
BATAVIA, ILLINOIS

Sales Representatives:
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B. M. Pilhashy, 833 Merchants Exchange Building, San Francisco 4, Calif.
Alldredge & McCabe, 847 E. 17th Ave., Denver 18, Colo.
Texas Chemical Engr. Co., 4101 San Jacinto, Houston 4, Texas

When inquiring check 1903 opposite last page

PROVED more wear per pair
Countless case histories record the fact that Sureseals outwear rubber and other synthetics (we make them, too) on most jobs.

SURETY
SURESEAL
INDUSTRIAL GLOVES
the only gloves made with HYCAR

For most of those "tough-on-gloves" jobs Surety Sureseals give you the greatest hand protection and longest service life. Sureseal has the highest resistance to practically all industrial chemicals, acids, oils, solvents, etc. . . . plus 4 times greater snag resistance and 10 times greater abrasion resistance. Write today on your letterhead and we'll arrange a test at our expense—just tell us the material gloves are subjected to. Sureseals are available in numerous styles including Turncuffs and various weights and lengths.

THE SURETY RUBBER CO.
CARROLLTON, OHIO
In Canada: Safety Supply Co., Toronto

When inquiring check 1904 opposite last page

Marking and imprinting machines described

Four-page brochure, printed in two colors, describes ten different marking and imprinting machines for packages, parts, and products. Illustrating and describing each unit, booklet covers such equipment as auxiliary marking and coding attachments, in-line imprinting machines, web printers and package wrap imprinters.

"Coding, Marking, and Imprinting Machines" is issued by Adolph Gottscho, Inc., Dept. CP, Hillside 5, N. J. When inquiring specify 1905 on form opposite last page.

Catalogs freeze dryers for laboratories

Including descriptions of freeze-drying units, 36-page catalog also lists related laboratory and small-scale production equipment useful in freezing and then drying under high vacuum. Equipment described includes vacuum gages and pumps, bath coolers, refrigerated centrifuges.

"Freeze-Drying Equipment for Laboratories" is issued by Arthur S. LaPine & Company, Dept. CP, 6001 S. Knox Ave., Chicago 29, Illinois. When inquiring specify 1906 on form opposite last page.

Glass yarns

Data, nomenclature, uses of glass fibers for textile yarns are presented in this 8-page catalog. Included is a yarn comparison table that lists glass fiber continuous-filament yarn data and equivalent yarn counts of cotton, worsted, and rayon.

Bul TYN-1 is issued by L.O.F. Glass Fibers Co., Dept. CP, 1810 Madison Ave., Toledo 1, Ohio. When inquiring specify 1907 on form which is located opposite last page.

NOW-A Better Rotary Joint!

Patent Pending

SIZES
½" ¾" 1" 1¼"
1½" 2" 2½" 3"

NEW BARCO TYPE C Rotary Joint

Announcing...

It's new! It's simple! It's versatile! And for countless applications, Barco's new Type C Rotary Joint will give you the best operating records you've ever had.

FOR ALL SERVICES—One basic style of revolving joint for single flow or syphon flow . . . one basic seal for steam, air, water, oil, gas—*or alternating hot and cold!* For temperatures to 450°F. Special to 500°F.

NO LUBRICATION NEEDED — Bearings and seal self-lubricating. Seal self-adjusting for wear. Long life without repairs or maintenance.

LOW TORQUE — Low starting and running torque*. Saves power. Suitable for any ordinary speed. To 200 psi, steam, or 400 psi, hydraulic.

COMPACT, SIMPLE — Malleable iron body; heat treated steel shaft; R.H. or L.H. thread. Eight sizes, ½" to 3".

for

STEAM
WATER
OIL
AIR or GAS

SEND FOR NEW CATALOG 310 TODAY.

*Typical example: 12 in. lbs. starting torque for 1" Type C on 100 psi water. Rotating torque, same.

FOUNDED 1908 BARCO PRODUCTS BACKED BY EXPERIENCE

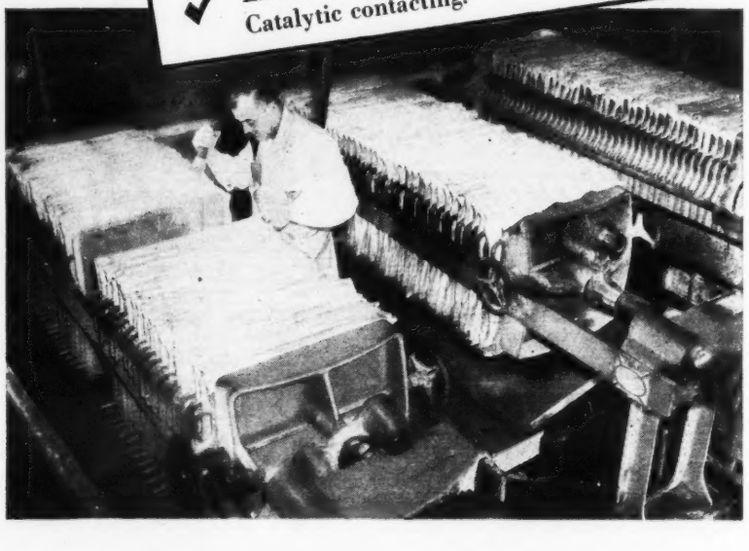
BARCO MANUFACTURING CO.
537C Hough Street • Barrington, Illinois

The Only Truly Complete Line of Flexible Ball, Swivel, Swing and Revolving Joints
In Canada: The Holden Co., Ltd., Montreal

When inquiring check 1908 opposite last page

Uses Unlimited for SHRIVER FILTER PRESSES

- ✓ Complete recovery of solids, reasonably dry.
- ✓ Perfect clarification of liquids, regardless of nature of slurry, even the most viscous materials.
- ✓ Filtration combined with bleaching, decolorizing, deodorizing, germproofing, winterizing.
- ✓ Washing filter cake — Redissolving cake.
- ✓ Extraction—Thickening of slurry.
- ✓ Catalytic contacting.



Because of their versatility, ability to function over the widest range of pressure and temperature, and withstand practically all operating conditions, Shriver Filter Presses are the most extensively used of all batch type pressure filters. They cost less and require less floor space per unit of filtering area.

Write for the Shriver Guide to Better Filtration.

Filter Presses
Filter Media
Diaphragm Pumps
Thickeners
Slab Formers
Electrolytic Cells

T. SHRIVER & COMPANY, Inc.

846 Hamilton St., Harrison, N. J.

Sales Representatives in

Decatur, Ga.—Houston, Tex.—St. Louis, Mo.—San Francisco—Montreal—Toronto

When inquiring check 1909 opposite last page

NEW LITERATURE

Lists chemical resistance of metals and valve seat materials

Advantages, applications, and dimensions of butter-fly valves are covered in 24-page illustrated bulletin. A twelve-page comparative guide of chemical resistant characteristics of various metals and resilient seat materials is featured. Photographs and drawings show full line of valves. Charts indicate pressure drop across valves.

Bul 956 is issued by Keystone Valve Corp., Dept. CP, 5325 Kirby Drive, Houston 5, Texas. When inquiring specify 1910 opposite last page.

Hose reels for every use highlighted in catalog

Specific advantages and typical applications of hose reels for every use are clearly illustrated in 20-page catalog. Photos are also used to illustrate various steps in manufacture of standard and custom units.

Cat RA6712 is issued by Clifford B. Hannay & Son, Inc., Dept. CP, 167 Maple St., Westerlo, N.Y. Specify 1911 opposite last page.

Features rubber gloves, sleeves for high-voltage protection

Rubber gloves and sleeves for protection against up to 20,000 volts are featured in 32-page, three-color booklet. Numerous photographs accompany discussion of manufacture, electrical testing, care, and selection of these gloves and sleeves. Other items offered are low-voltage gloves, blanket and wire clamps, water-repellent spray, and danger flags. Price list and ordering instructions are included.

"Linemen's Protective Equipment" is issued by Charleston Rubber Co., Dept. CP, Stark Industrial Park, Charleston, S.C. When inquiring specify 1912 on form opposite last page.

How to repair iron using plastics

Details of repair procedure for making weldless repairs to iron and steel tanks, conduits, containers, and surfaces by using an epoxy resin and glass cloth lay-up are given in this two-page data sheet.

Technical Bulletin 14 is issued by Smooth-On Manufacturing Co., Dept. CP, 572 Communipaw Ave., Jersey City 4, N.J. When inquiring check 1913 on form opposite last page.

FLEXIBLE TUBING

Made from

TEFLON*

For

Chemical Feed Lines (laboratory, catalyst, pilot plant reusable), Hot Corrosive Liquids or Steam Lines, Hydraulic Hose, Braiding and Fittings for Pressure Use

And Similar Applications Where Only PF TEFLON* Can Do The Job

PROPERTIES

- complete chemical inertness
- lowest coefficient of friction of any solid material
- very low permeability
- widest service temperature of any plastic (-450°F to +500°F)
- easily cleaned and sterilized without deterioration

Pa. F. flexible tubing is available in a full range of colors and sizes. Our extrusion techniques yield maximum service flexibility and all sizes are carefully inspected and controlled dimensionally.

Write, wire or 'phone for additional details, competent engineering assistance and prompt attention to special sizes and walls. Pressure testing and certification upon request.

PENNSYLVANIA FLUOROCARBON CO., INC.

1115 N. 38th St., Phila. 4, Pa., EV 6-7680

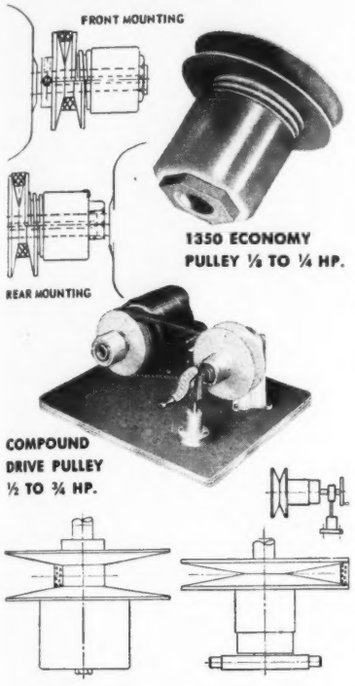
*"Teflon"—DuPont trade name for Tetrafluoroethylene resin

When inquiring check 1914 opposite last page

Lovejoy

Fractional Horsepower

VARIABLE SPEED PULLEYS



Economical—
low in initial cost . . . easily installed on old or new equipment.

Minimum Maintenance—
simple construction assures trouble-free operation . . . lifetime lubricated with oil-impregnated bronze bushings.

Constant Belt Alignment—
inner and outer pulley sheaves open equally to provide smooth, infinitely variable speed ratios to 8 to 1.

No Slippage—
Sure grip of belt sides delivers full traction under all load conditions...result is greater horsepower carry capacity.

Get the new 12-page Lovejoy catalog! Write today.

LOVEJOY FLEXIBLE COUPLING CO.
4872 W. Lake St., Chicago 44, Ill.

When inquiring check 1915 opposite last page

Chart presents selection data for cooling towers

Industrial cooling towers for application where process water temperatures are critical are described in 10-page bulletin. Charts present correction factors and complete unit selection data. Diagrams and tables cover dimensional data in detail. Mechanical specifications and details of construction are listed.

Bul 203 is issued by Baltimore Aircoil Company, Inc., Dept. CP, 2615 Mathews St., Baltimore, Md. Specify 1916 opposite last page.

Fluid agitation handbook outlines approach to mixing problems

Theoretical and practical approaches to fluid mixing problems in the process industries are covered in detail in 46-page pocket-size handbook. Text outlines step-by-step procedures for determining optimum mixing characteristics of fluids in relation to their physical properties. Methods are given for scaling-up laboratory mixing operation to production process. Experimental agitator for bench-scale and pilot-plant mixing is described. Mixer permits small-scale agitation without loss of geometric, kinematic or dynamic similitude. Handbook contains numerous charts, diagrams, and photographs.

To obtain "Fluid Agitation Handbook" remit $1.50 to Chemineer, Inc., Dept. CP, 1044 East First St., Dayton 2, Ohio.

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If you are responsible for processing operations in an administrative, production management, engineering or technical function, it may be possible to send you copies of CHEMICAL PROCESSING regularly, without charge.

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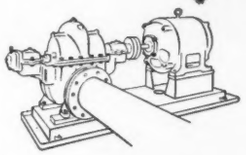
TYPE 9 PACKAGED SEAL

FOR CORROSIVE and High Temperature SERVICE



easily installed in split-case pumps

This "John Crane" Type 9 Seal is the answer to a simplified means of seal installation (or removal) in modern split-case pumps.

Need for unbolting the upper half of the casing is eliminated, since the unit is mounted on a sleeve with an outside clamping ring.

Sealing members of DuPont Teflon readily adapt this seal to the handling of chemicals, solvents and corrosives, plus high temperature and similar conditions under which rubber cannot be used.

Springs and metal parts are furnished in the metallurgical specification best suited to the service.

Wherever "hard-to-handle" liquids or gases are involved . . . temperatures from −120° to +500°F. . . pressures to 750 psi . . . the "John Crane" Type 9 Seal is *the* seal for your pump.

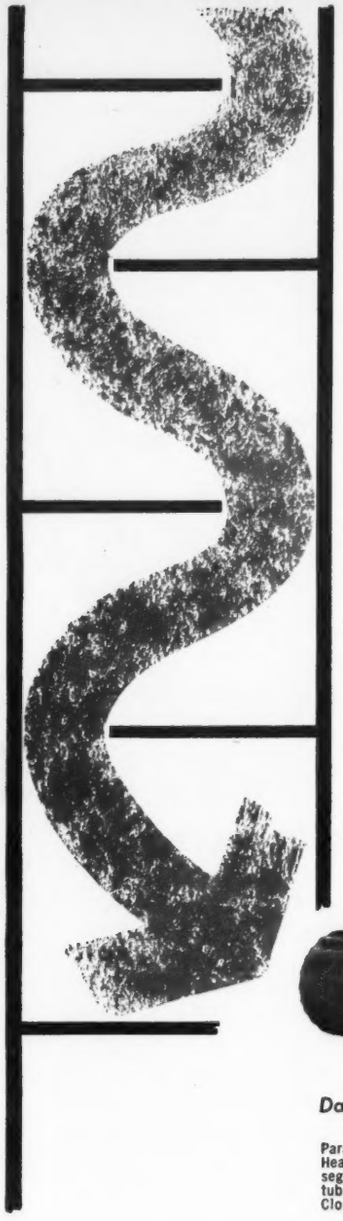
Get complete facts and engineering data on the "John Crane" Type 9 Packaged Seal with outside lock collar. Contact Crane Packing Co., 6421 Oakton Street, Morton Grove, Illinois, (Chicago Suburb). *In Canada: Crane Packing Co., Ltd., 617 Parkdale Ave., N. Hamilton, Ont.*

*DuPont Trademark

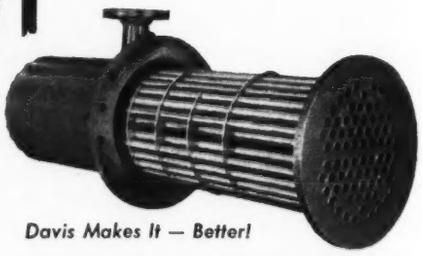
John Crane®

CRANE PACKING COMPANY

When inquiring check 1917 opposite last page



How a Paracoil OBSTACLE COURSE gives you better heat exchange



Davis Makes It — Better!

Paracoil Type "P" Exchanger, 2-Pass Type, Stationary Head End. Tube bundle partially withdrawn, showing segmental baffles. Note close tolerances between tubes and baffles, and between baffles and shell. Close baffle tolerances assure higher heat transfer rates.

Tumble the liquid . . . keep it baffled . . . make it take the long way home . . . that's what Davis will do to create proper turbulence to give you the most efficient heat transfer in equipment designed for your needs. And, we know just how to do it.

Our engineers have been designing equipment for chemical process industries, industrial process application, power plants, utilities and marine projects since 1915.

Write for Bulletin 1000

DAVIS ENGINEERING CORPORATION

30 Rockefeller Plaza, New York 20, New York Circle 6-5650

1064 East Grand Street, Elizabeth 4, New Jersey ELizabeth 2-6780

When inquiring check 1918 opposite last page

NEW LITERATURE

Chemical reactions of fatty alcohols

A very detailed descriptive listing of reactions of fatty alcohols is given in this 16-page book. Over fifty reactions are presented. Technical data on the unsaturated aliphatic and saturated aliphatic alcohols are given, along with the comparison of melting and boiling points of the saturated monohydric alcohols. The bibliography has 70 entries.

Bul No. 907-R is issued by Chemical Products Div., Archer-Daniels-Midland Co., Dept. CP, 700 Investors Bldg., Minneapolis 2, Minn. When inquiring specify 1919 on form opp. last page.

Industrial insulations

Manual of 132 pages makes use of 21 graphs, 104 photographs, 84 sketches, and 74 tables to tell story of company's industrial insulations. Details include application information, operating temperatures, engineering data, recommended thicknesses and heat gain, and multiple layer combinations. Manual is bound so that sheets, or sections, can be removed and used independently.

A.I.A. File No. 37-D is available from Owens-Corning Fiberglas Corp., Dept. CP, Toledo 1, Ohio. Specify 1920 opposite last page.

". . . flash point <100° C. . ."

LUZERNE PVC PIPE & FITTINGS

Will Help Solve Your CORROSION PROBLEMS!

Having trouble with corrosion or internal build-up of slime and scale in your piping? The smooth inside surface of LUZERNE rigid, unplasticized Polyvinyl Chloride Pipe and Fittings means less of this difficulty; and because it's nonmetallic, electrolytic action is eliminated, too.

LUZERNE PVC Pipe and Fittings are light in weight, easy to install with either screwed fittings or welding socket fittings, and economical. Immediate delivery. Sizes ½" to 6". (Large sizes on request.)

SEND FOR BULLETIN PF-1100

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When inquiring check 1921 opposite last page

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ACME

. . . the Gas Mask that gives you
MAXIMUM USABLE VISION

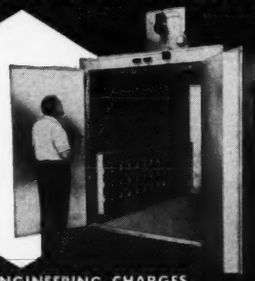
Tests prove that ACME Gas Masks lead the field in giving you clear, undistorted vision — up, down, and to either side. Along with maximum usable vision, you get greater comfort, less fogging, minimum breathing resistance and acceptable conversation transmission — all at down-to-earth prices. Write for Bulletin No. 541 on gas masks.

FREE PROTECTION GUIDE lists 433 gas hazards and how to overcome them. Write for Bulletin No. 542.

ACME PROTECTION EQUIPMENT CO.
1219 Kalamazoo Street, South Haven, Michigan

When inquiring check 1922 opposite last page

SAVE INSTALLATION TIME with GRIEVE-HENDRY WALK-IN OVENS



• Shipped completely "Set-Up"—Previously Tested and ready to operate

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Save time and money by buying Grieve-Hendry STANDARD WALK-IN OVENS.
Shipped promptly at lower cost because they have been engineered to standards, thereby saving time and extra engineering charges.
Shipped set-up — ready to work — just uncrate and make service connections to outlets provided — no installation crew or tie-up in your plant necessary.
Latest convenience features and safety devices included. Design changes to suit special requirements. Electric, gas or oil heated. Write for bulletin.

- Prompt quotations on ovens to your specifications.
- Standard models to 1200° F. $110.50 and up.
- Sales engineers in all principal cities and many foreign countries.

GRIEVE-HENDRY CO., INC.
1414 W. Carroll Ave., Chicago 7, Ill.
Export Dept., 10406 S. Western Ave., Chicago 43, Illinois

When inquiring check 1923 opposite last page

NEW LITERATURE

Plastic tooling information — eight-page handy summary

Illustrated eight-page publication summarizes applications of plastic tooling. Attention is given to time and labor savings, easy handling and storage, and quick design changes. Guidance is provided on selecting suitable methods of constructing plastic tools, with descriptions of casting, laminating and combination of these procedures.

"The Marblette Digest of Plastic Tooling" is issued by the Marblette Corp., Dept. CP, 37-31 Thirtieth St., Long Island City 1, N. Y. When inquiring specify 1924 on form opposite last page.

Packing a carload for safety

Packaging and loading boxcars to give maximum product protection are the subjects of an illustrated 48-page guide. Tools and materials used are also illustrated and described.

Seventeenth Edition of "Packaging and Carloading Guide" is issued by Signode Steel Strapping Co., Dept. CP, 2600 N. Western Ave., Chicago 47, Ill. When inquiring specify 1925 on form opp. last page.

NIR Conference proceedings

Proceedings of the 1956 National Industrial Research Conference are available. Book includes all of the papers presented at the sessions. All stress practical considerations involved in industrial research and development, and the profit motive in research.

To obtain proceedings of the National Industrial Research Conference remit $6 direct to conference secretary, Armour Research Foundation, Dept. CP, 10 W. 35th St., Chicago 16, Ill. When inquiring specify 1926 on form opposite last page.

ACCO products

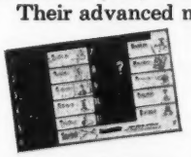
New R-P&C F56 and F57 Forged Steel Gate Valves

. . . FOR GREATER ADJUSTABILITY, SMOOTHER OPERATION, LONGER PACKING LIFE

• These, and many other "plus" features, have been designed into these brand-new valves specially developed for power, petro-chemical, and process piping applications. Rated for 2000 PSI at 100° F or 800 PSI at 800° F, they are furnished in sizes from ¼" to 2" with either screwed (**F56**) or welded (**F57**) ends.

Their advanced new design includes quality features like a new "teardrop" 500 BHN heat treated stainless steel wedge which is mated with hard chrome plated stainless steel seat rings to effectively resist seizing, galling or abrasive wear. A Flexitallic spiral-wound gasket, reusable in normal service, assures a positive tight joint. Bulky flanges are eliminated for lower weight and streamlined appearance. Follower, eyebolt, gland nut and operating nut are all stainless steel.

The end result is a lighter, yet sturdier valve which gives better service. Get the complete story. Write today for **Bulletin DH-525.**



FREE WALL CHART
"How to Protect Your Valves"
17" x 11" wall chart gives installation and operation pointers to protect valves, prolong life. Free on request.

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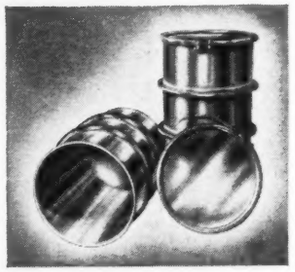
R-P&C valves

When inquiring check 1927 opposite last page

as easy as re-sealing a pop bottle



Hackney removable head stainless steel drums protect shipments...open easily...close tightly

Here's the air-tight, liquid-tight shipping container that provides instant access to congealed or solidified contents.

Sealed with a gasket and quick-acting Toggle-tite (or single-bolt) closure, removable head covers top rim of barrel—protects product from contamination—is readily re-sealed when contents are not all removed at once. Crevice-free interiors are easily and quickly cleaned. Lightweight design saves shipping and handling money for you. Made in several standard sizes—in steel, stainless steel, nickel or nickel alloy.

Returnable Shippers for Every Need...

Removable head drums are just part of the complete line of Hackney lightweight returnable shipping containers for the chemical industry. Others are tight head drums, two-piece or three-piece acid drums, seamless bilged barrels, stainless steel 15½-gallon acid barrels. Send for complete Hackney Drum and Barrel Catalog.

Pressed Steel Tank Company

Manufacturer of Hackney Products

1463 South 66th Street, Milwaukee 14, Wisconsin

Branch offices in principal cities

CONTAINERS AND PRESSURE VESSELS FOR GASES, LIQUIDS AND SOLIDS

When inquiring check 1928 opposite last page

NEW LITERATURE

Underground pipe protected with tape insulation

Techniques for protecting underground pipe from corrosion with manufacturer's brand of pipe insulation tape is subject of 24-page booklet. Step-by-step photographs and instructions for wrapping bends, elbows and short sections, patching pipe with tape, preparing joint surfaces for wrapping, wrapping welded joints and taping straight pipe sections are provided. Table listing recommended tape width for different pipe sizes, outlining minimum recommended tape overlap and number of squares of tape needed per 100-ft of pipe is included.

"Tape It Easy" is issued by Minnesota Mining and Manufacturing Company, Dept. CP, 900 Fauquier St., St. Paul 6, Minn. When inquiring specify 1929 on form opposite last page.

Comparative coatings chart guide for engineers

Chart which shows the comparative chemical resistance of different classes of coatings such as vinyl, epoxy, chlorinated rubber, and others, should be quite useful to the coatings engineer.

"Comparative coatings charts" is issued by J. Landau Co., Dept. CP, Carlstadt, N. J. When inquiring specify 1930 on form which is located opposite last page.

Tells about tube expanders in 119 pages

Detailed information on tube expanders and associated tools used for tube rolling is contained in well-illustrated, 119-page catalog. Uses of each piece of equipment and new tools and methods are discussed.

Cat 88 is issued by Thomas C. Wilson, Inc., Dept. CP, 21-11 44th Ave., Long Island City 1, N.Y. When inquiring specify 1931 on convenient Readers Service slip opposite last page.

Over 3500 organic chemicals

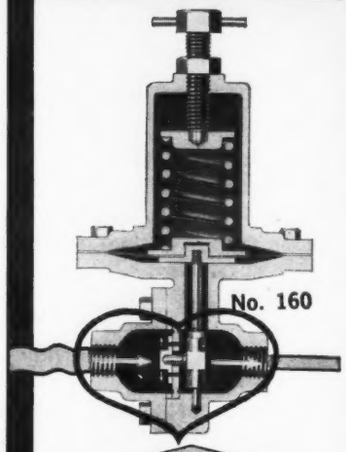
More than 3500 organic chemicals are described in this 224-page, 6x9½" catalog. Most of these are research chemicals with long-sounding names, but you'll find many of the old standbys listed, too. Quantity and price data are given.

"Eastman Organic Chemicals List No. 40" is issued by Distillation Products Industries, Div. of Eastman Kodak Co., Dept. CP, Rochester 3, N.Y. Check 1932 opposite last page.

OPW-JORDAN

pressure reducing

VALVE*



with the Sliding Gate and Plate

the heart of the OPW-JORDAN Valve

THE DIFFERENT AND IMPROVED WAY TO CONTROL PRESSURE.

- DEAD END SHUT-OFF
- WIRE DRAWING MINIMIZED OR ELIMINATED
- SELF-LAPPING SEAT
- NO HUNTING . . . SHORT STROKE FOR IMMEDIATE RESPONSE

The unique Sliding Gate seating design and exclusive features of this valve are responsible for its outstanding performance and long dependable service life. Metallic diaphragm, metal to metal seals, no packing or gaskets to deteriorate, straight-thru body and durable construction assure precise regulation with immediate response and unusual sensitivity under hard, constant use.

*Daily replacing troublesome pilot operated valves.

For interesting facts, write for Bulletin J-160.

JORDAN CORPORATION

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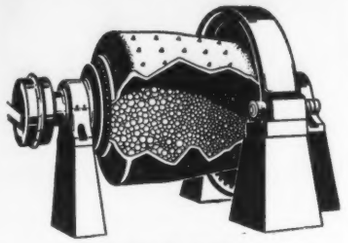
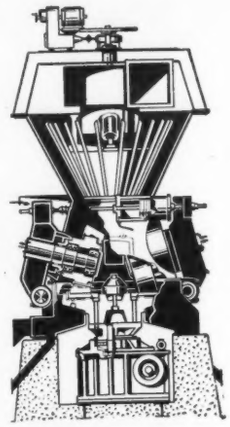
When inquiring check 1933 opposite last page

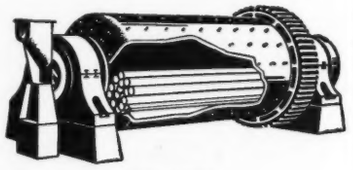
GRINDING MILLS



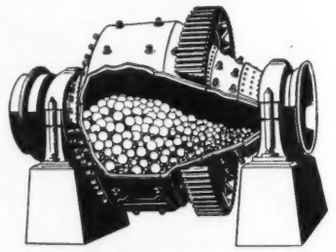
TRICONE MILLS



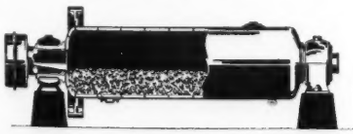
DISC-ROLL MILLS



ROD MILLS



CONICAL MILLS



TUBE MILLS
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When inquiring check 1934 opposite last page

NEW LITERATURE

Flexible-plastic tubing — 28 pages of data

Twenty-eight page booklet on flexible plastic tubing covers a number of formulations in detail and presents the applications and limitations of each formulation. Physical properties and chemical resistances are presented in chart and table form. Actual applications are also given.

Bul T-97 is issued by Plastics and Synthetics Div., The U.S. Stoneware Co., Dept. CP, Akron 9, Ohio. When inquiring specify 1935 on the convenient Reader Serivce slip which is located opposite last page.

Five major chemical processes reviewed in 12-page catalog

Plants for the manufacture of alkyd resins, fatty alcohols, phenolic resins, and maleic anhydride, and for fatty acid hydrogenation are described in 12-page brochure. Particular attention is given to the variables and factors which are most critical to efficient and economical operation. Typical flow sheets, piping layouts, equipment designs, and installations are illustrated.

Catalog is issued by Industrial Process Engineers, Dept. CP, 8 Lister Avenue, Newark 5, N. J. When inquiring specify 1936 on form opposite last page.

Chemical and physical data on 16 lithium compounds

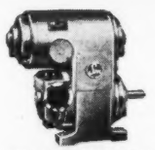
Detailed data on the uses and chemical and physical properties of 16 lithium compounds are contained in 38-page folder. Folder is in loose leaf form to provide for insertion of new data as they become available.

"Chemical and Physical Properties of Lithium Compounds," is issued by Foote Mineral Co., Dept. CP, 18 W. Chelten Ave., Philadelphia 44, Pa. When inquiring specify 1937 on form opposite last page.

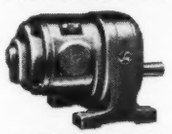
STOP! . . . GO BACK!

There's an important message for VIPPs on page 81!

Can your machinery meet the challenge of change?



STERLING SPEED-TROL VARIABLE SPEED MOTORS



STERLING SLO-SPEED GEAR MOTORS

STERLING CONSTANT NORMAL SPEED MOTORS

STERLING MULTI-MOUNT SPEED REDUCERS

Sterling Speed-Trol Variable Speed Motors provide you with one of industry's greatest production advantages—versatility of machinery and equipment. Only by adapting speed of machinery to changes in product, material, volume or to any other factor influencing productivity and product quality can you have this important competitive advantage—operating machinery at optimum efficiency under changing production conditions. Investigate the benefits Speed-Trol Variable Speed Motors can bring to your plant. They have your production future built into them.

WRITE TODAY FOR STERLING SPEED-TROL VARIABLE SPEED MOTOR BULLETIN NO. 188

Sterling offers you a wide range of Electric Power Drives of advanced design—variable speed or constant speed—with manual or automatic controls.

STERLING ELECTRIC MOTORS
Los Angeles 22 · Chicago 38 · Cincinnati 37 · New York 51

When inquiring check 1938 opposite last page

*Pacific's "Y" Globe Valves are setting new standards of performance in this vital field. With the demand for higher and higher operating pressures, new importance is placed on the flow characteristics, pressure drop, and speed of operation. These "Y" Valves offer the advantages of conventional Globe Valve seating with vastly improved resistance coefficients. The relatively short travel of these valves makes possible very rapid, split second remote control. These Valves can be ordered with manual control or equipped with cylinder actuators, either with or without emergency self closing or opening features. For liquid Oxygen service two important features are offered: a patented metal to metal seat arrangement with a Teflon seal; and a long finned section to protect stem packing from the intense cold. These valves are available in most popular sizes and pressures up to 2500 lbs.

We invite your inquiry for additional data on these valves or any of Pacific's regular line of Cast or Forged Steel Gate, Globe or Check Valves, or our complete line of Corrosion Resistant Valves.

Write or Phone today for our latest Brochure, "Pacific 'Y' Valves" further describing these Valves or request a Sales Engineer to discuss your particular problem with you directly . . . no obligation . . . of course!

PACIFIC VALVES, INC.

3201 Walnut Avenue, Long Beach 7, California

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Branch Offices in Houston, Texas, and Woodbury, New Jersey, with Warehouse Stocks and with Complete Valve Reconditioning Facilities.

Sales Offices In All Principal Cities

When inquiring check 1939 opposite last page

NEW LITERATURE

Glycerine: terms and tests, properties and uses

Two digest-size bulletins supply comprehensive data about glycerine. "Glycerine Properties and Uses" is a handy reference to this compound's role in industry. Glycerine's chemistry and properties and its function in its principal industrial application are covered. "Terms, Tests, and Technical Data" defines grades; US and British specs are given and explained, and test methods are covered in detail. Both booklets are 20 pages long and are issued by Glycerine Producers' Association, Dept. CP, 295 Madison Ave., New York 17, N.Y. When inquiring check 1940 on the convenient Reader Service slip which is located opposite last page.

1,5-Pentanediol

Technical information on 1.5-pentanediol is presented in six-page manual. Physical properties and reactions are given. Applications described include use in making polyester resins for urethane foams and elastomers, glass fiber laminating resins, and in magnet wire enamels. Its esters are useful as vinyl plasticizers. Compound also makes specialty lubricants, brake fluid components, insect repellents, and special purpose solvents.

Bul F-40006 is issued by Carbide and Carbon Chemicals Co., a Div. of Union Carbide and Carbon Corp., Dept. CP, 30 E. 42nd St., New York 17, N.Y. When inquiring check 1941 on the convenient Reader Service slip which is located opposite last page.

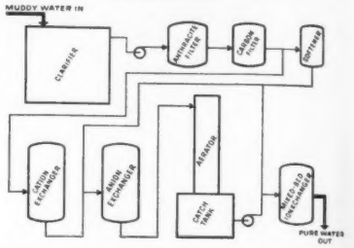
Service report discusses cleaning in chemical industry

Manufacturer's service report covers basic survey of cleaning requirements and procedures in chemical industry. Report discusses nature of soils usually encountered in chemical processing equipment, and recommends compounds developed to remove them. Up-to-date cleaning methods such as in-place chemical circulation, tank-soak, and steam-detergent cleaning, along with equipment designed for mechanized cleaning, are described. Time-saving methods for cleansing operations on processing towers, heat exchangers, storage tanks, tank trucks, etc. are shown. Company's research facilities and technical services are pointed out.

Service Report B-6039 is issued by Oakite Products, Inc., Dept. CP, 157 Rector St., New York 6, N. Y. When inquiring specify 1942 on form opposite last page.

ILLCO-WAY ionXchange

HIGH-PRESSURE BOILERS NEED PUREST WATER



An ILLCO-WAY System, incorporating up-to-date ionXchange equipment, offers the best opportunity available today for obtaining the high-purity water that modern high-pressure boilers *must* have to avoid serious loss of operating efficiency. Such a System will take the muddiest kind of hard river water and clean it up so that suspended impurities, mineral content, and dissolved solids are reduced to almost unmeasurable quantities. The result — top boiler performance, always, and top *turbine* performance.

ONE SOURCE FOR THE WHOLE SYSTEM

Today, such a System can be obtained, *complete,* from a single source — Illinois Water Treatment Company. We design and manufacture every element to solve successfully the particular application. You do not need to combine a part from here and a portion from there — you get it *all* from us, all tanks, all piping, all valves and controls, all resins and other materials, all carefully selected to suit *your* needs. *Consult our experienced engineers at the next opportunity . . .*

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CANADIAN DIST. PUMPS & SOFTENERS, LTD. LONDON, ONT.

When inquiring check 1943 opposite last page

Here's Why
I-R CHEMICAL PUMPS
give you

EXTRA PROTECTION

against

CORROSION

Ingersoll-Rand Class HC Chemical Pump

IRCAMET developed by Ingersoll-Rand especially for chemical pump service, is a high nickel-chromium molybdenum alloy steel with exceptional resistance to the corrosive action of a wide variety of acid and alkaline solutions. All pump casing and impeller parts in contact with the liquid handled are made of IRCAMET. The shaft is made of a similar wrought alloy. For lasting external protection, the entire unit is sprayed with a special paint which is highly resistant to chemical action.

Ingersoll-Rand Chemical Pumps are available in sizes to handle up to 4,000 gpm at temperatures to 800F. For complete information, ask for Bulletin No. 7095-A. If you have a pumping problem, your nearest I-R representative will be glad to assist you in any way possible.

Ingersoll-Rand

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PUMPS • CONDENSERS • TURBO-BLOWERS • GAS & DIESEL ENGINES
COMPRESSORS • AIR & ELECTRIC TOOLS • ROCK DRILLS

When inquiring check 1944 opposite last page

Synthetic organics cataloged

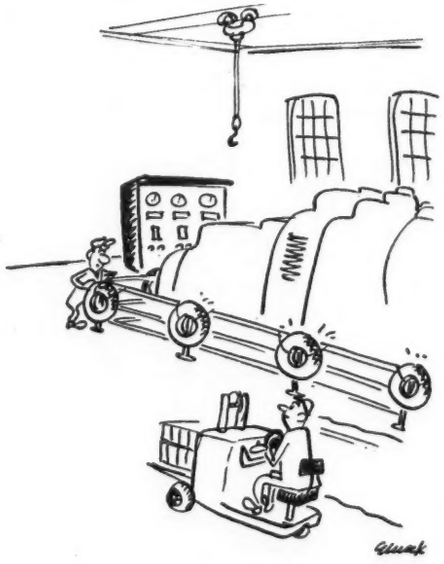
Seventy-seven synthetic organic compounds for use as intermediates, solvents, surface-active agents and fuel gas odorants are cataloged in 12-page booklet that is punched for notebook insertion. Name, description, and suggested uses are presented. Industries for which chemicals are destined: rubber, paper, mining, oil refining, paint, textiles, plastics, agricultural chemicals and pharmaceuticals.

Cat S-101 is issued by Dept. S, Industrial Div., Pennsalt Chemicals Co., Dept. CP, 3 Penn Center Plaza, Philadelphia 2, Pa. When inquiring check 1945 on form opposite last page.

Bulletin series depicts motors

Series of four six-page bulletins describe and graphically illustrate company's direct-current, explosion-proof, totally-enclosed fan-cooled, and open motors. Readings and dimensions are given. Page-size cutaway views are used to point out advantages and construction features.

Buls 53B8424, 51B7286G, 51B7225D, and 51B6210G are issued by Allis-Chalmers Manufacturing Co., Dept. CP, 1151-70th St., Milwaukee 1, Wis. When inquiring specify 1946 on form opposite last page.



ADVERTISEMENT

E-D Filter Paper Makes Excellent Cover For Cloth Or Other Filter Media

Provides Greater Clarity Of Filtration And Prolongs Life Of Filter Medium

FILTERTOWN, USA. Field reports prove that there is an increasing use of E-D filter papers, with the greatest demand for grade # 953, as a cover for cloth or other filter media in industrial filtration. To date, this practice has been widely adopted in plants which process oils, including coconut, cod liver, corn, cooking, linseed, soybean, and vegetable oil. These plants manufacture margarine, salad oil and shortening, soaps, paint, varnish, and many other products.

Great Savings In Time And Money

Actual experience, in hundreds of cases, has proven to the satisfaction of production officials that it is far more economical to cover the cloth or other filter medium with E-D filter paper and then, when the press needs redressing, to simply peel off the paper, discard it, and replace with a clean E-D filter paper cover. Substantial savings in press running time are made.

E-D filter paper holds up solid particles to such a degree that there is often little need for recirculating the slurry to obtain an adequate cake deposit for clear filtration at the start of a cycle.

Moreover, the E-D filter paper protects the filter medium from slimy fines, thus prolonging its useful life, saving additional money on media expenditures. The cost of E-D filter paper is so little, in comparison with the cost of other filter media, that these savings are important.

Greater Clarity Of Filtrate Obtained

Because of its fine porosity and unique uniformity of furnish, grade #953—as well as the many other grades of E-D filter paper—obtains exceptional clarity of filtrate. Many degrees of rapidity and porosity are available in the more than 50 regular grades manufactured by The Eaton-Dikeman Company. Special grades are also made to meet individual requirements.

Free Samples Available

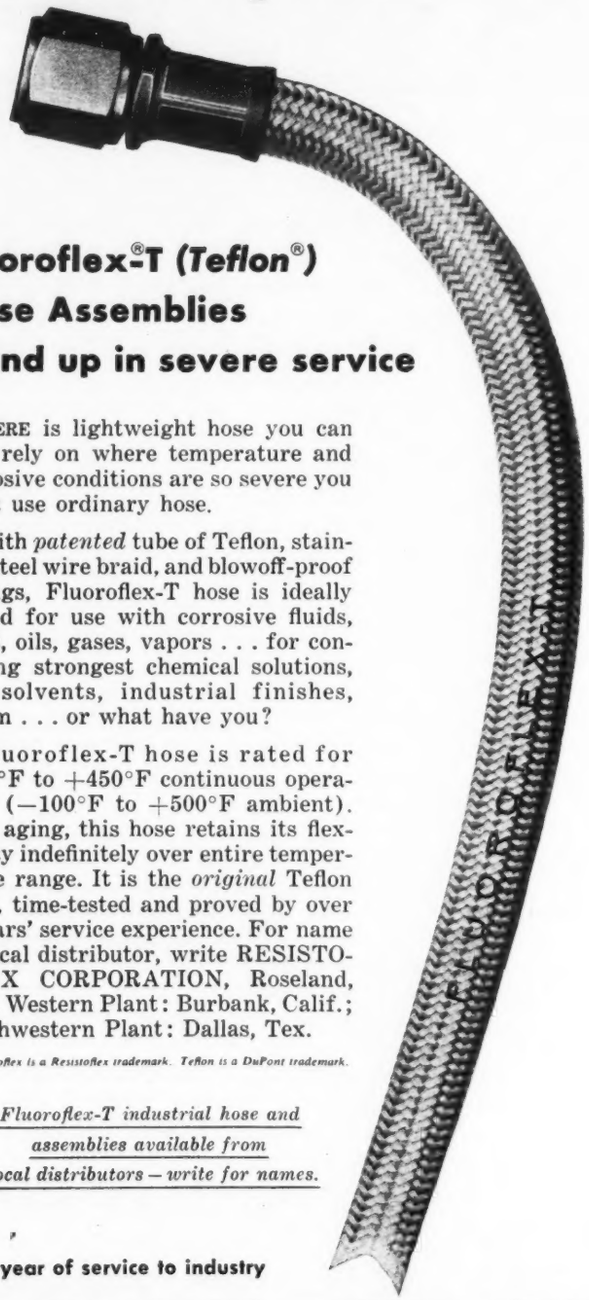
Actual tests made at the user's plant furnish convincing proof of the many advantages that are possible. Simply write for E-D's Filtration Analysis Report. When the necessary facts are supplied, you will receive several recommended grades, cut to your own size and specifications, at no charge. Make the necessary test runs and you will soon be able to determine the benefits for yourself. There is no charge or obligation for this service.

Write to Thomas H. Logan, Jr., care of The Eaton-Dikeman Company, Filtertown, Mount Holly Springs, Pennsylvania for prompt attention.

This company is the only company in America that is exclusively engaged in the manufacture of filter paper for science and industry. Authorized representatives and dealers are located in every section to provide service and helpful information on all problems relating to liquid filtration.

When inquiring check 1947 opposite last page

Heat resistant and corrosion-proof too!



Fluoroflex®-T (*Teflon*®) Hose Assemblies stand up in severe service

HERE is lightweight hose you can rely on where temperature and corrosive conditions are so severe you can't use ordinary hose.

With *patented* tube of Teflon, stainless steel wire braid, and blowoff-proof fittings, Fluoroflex-T hose is ideally suited for use with corrosive fluids, fuels, oils, gases, vapors . . . for conveying strongest chemical solutions, hot solvents, industrial finishes, steam . . . or what have you?

Fluoroflex-T hose is rated for −65°F to +450°F continuous operation (−100°F to +500°F ambient). Non aging, this hose retains its flexibility indefinitely over entire temperature range. It is the *original* Teflon hose, time-tested and proved by over 4 years' service experience. For name of local distributor, write RESISTOFLEX CORPORATION, Roseland, N. J. Western Plant: Burbank, Calif.; Southwestern Plant: Dallas, Tex.

® *Fluoroflex is a Resistoflex trademark. Teflon is a DuPont trademark.*

Fluoroflex-T industrial hose and assemblies available from local distributors — write for names.

20th year of service to industry

RESISTOFLEX

When inquiring check 1948 opposite last page

NEW LITERATURE

Fatty alcohols and acids

Saturated and unsaturated fatty alcohols, fatty acids, glycerides, and sperm oil products are presented in tabular form in four-page folder. Approximately 65 products are charted.

Bul No. 908-A is issued by Chemical Products Div., Archer-Daniels-Midland Co., Dept. CP, 2191 W. 110th St., Cleveland 2, Ohio. When inquiring specify 1949 on form opposite last page.

Noble metal contacts

Electrical contact materials: gold, platinum, silver, palladium, their alloys, and sintered powdered metals are reviewed in 28-page technical catalog. Electrical and physical properties and typical applications of contacts made from respective material are discussed. Reference charts for contact selection and circuit design are included.

"Baker Electrical Contacts" is available on letterhead request from The Contact Div. of Baker & Co., Inc., Dept. CP, 113 Astor St., Newark 5, N.J.

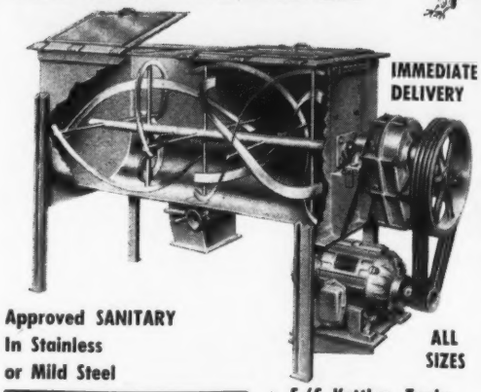
Shows overhead conveyor for loads to 240 lb

Powered and free operating overhead conveyors for handling intermediate loads (to 240-lb) through stage processing, intermittent storage, or "stop and go" operations are discussed in four-page, two-color bulletin. Typical installations of conveyors are pictured.

"Chainveyor — A Revolutionary Conveyor for All Purposes" is issued by Chainveyor Corporation, Dept. CP, 5618 E. Washington Blvd., Los Angeles 22, Calif. When inquiring specify 1950 on form opposite last page.

The Newest — Most Advanced

FALCON BLENDER



IMMEDIATE DELIVERY

Approved SANITARY In Stainless or Mild Steel

ALL SIZES

Send For Complete Bulletin

- S/S Kettles, Tanks
- Reactors, all Metals
- Tumbling Mixers
- Rotary Cutters

The FALCON MANUFACTURING DIVISION OF

The FIRST MACHINERY CORP.

211 Tenth St., Brooklyn 15, N. Y.

Cable: Effemcy ST. 8-4672

When inquiring check 1951 opposite last page

FIRM-GRIP INDUSTRIAL GLOVES

AMERICA'S MOST POPULAR HAND SAFETY GLOVES

- *Permanent* NON-SLIP on all 5 fingers and palm. Highly efficient embossed surface is integral part of glove.
- *Curved* FINGERS for comfort and easy use.
- *Tough and Durable.* Longer wear in every pair.

GENUINE RUBBER LATEX OR NEOPRENE LATEX

SEND for catalog and prices of complete Industrial Glove line.

SEIBERLING LATEX PRODUCTS

Division of Standard Industries, Inc.
NEW BREMEN, OHIO

When inquiring check 1952 opposite last page

AJAX LO-VEYORS

FOR MULTI-PURPOSE HANDLING AND PROCESSING OF BULK MATERIALS

This popular type of Ajax open pan Lo-Veyor is used extensively where there are no contamination problems.

AJAX Lo-Veyors are made in lengths from 3 feet up. They are available in open pan or booted cover types to safeguard critical processes or formulas against contamination. Conveyor pans can be arranged for simultaneous screening, washing, drying, cooling and other operations. Stringy, elongated, abrasive, fine or course mesh materials never hang up while being conveyed in Ajax Vibrating Lo-Veyors. The positive upward and forward tossing action keeps materials flowing freely and evenly.

Tubular type Ajax Lo-Veyors provide sealed, gas tight operation in closed systems under vacuum or pressure. Diaphragm seals can be used where tube passes through walls of processing plants.

Ajax Vibrating Lo-Veyors are self-contained, require little head room for drive and pan, are easily and quickly installed on or below floor levels or suspended from walls or ceilings. Made in a wide range of sizes and lengths, they are being used from beginning to end in progressive processing.

Write for Bulletin 39

AJAX FLEXIBLE COUPLING CO. INC.
WESTFIELD, N. Y.

When inquiring check 1953 opposite last page

alphabetical index on page 221

. . . for alphabetical index of all processes, materials, services, and equipment discussed in this issue's editorial columns and advertisements, turn to page 221. "Quick-locator" starting on that page was a feature in CHEMICAL PROCESSING years ago. It means extra work for the Editors, but it helps you, the reader in finding what you want . . . in a hurry!

Studies silica-aluminas catalyst activity

Two reports from the multiple fellowship of Gulf Research and Development Company are available on request. Studies are on silica-alumina cracking catalysts and cover the water content of a catalyst and its component oxides and the exchange of hydrogen between isobutane and deuterated cracking catalyst.

Publications are available from Mellon Institute, Dept. CP, 4400 Fifth Ave., Pittsburgh 13, Pennsylvania.

Equipment for detection of combustible gas

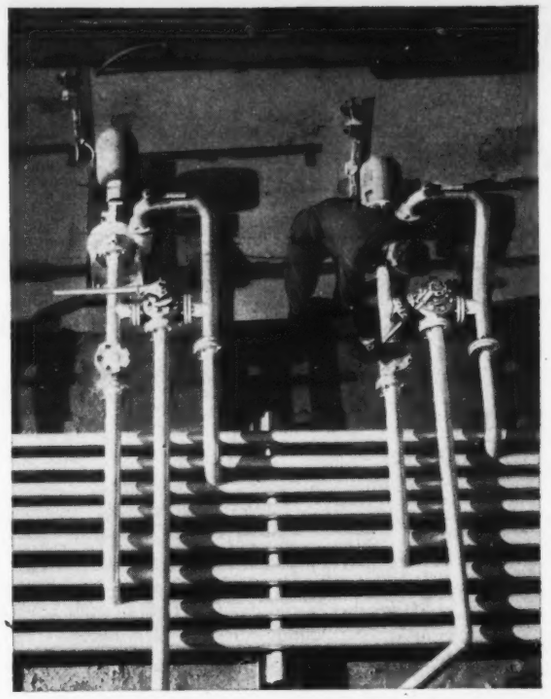
Two-page specification sheet describes alarm equipment for fixed-location protection. Illustrations show types of equipment. Operational and construction data are detailed, and application suggestions are included.

"J-W Model E Combustible Gas Alarm" is issued by Johnson-Williams, Inc., Dept. CP, Box 6, Station A, Palo Alto, Calif. When inquiring specify 1954 on form which is located opposite last page.

Tells about care of eyes after forty

Changes which takes place in the eyes after the age of forty are traced in six-page brochure. Diseases like glaucoma and cataract, which strike hardest among older people, are explained. Questions frequently asked concerning eye care in later years are answered in a special section.

"Your Eyes After Forty" is issued by National Society for the Prevention of Blindness, Dept. CP, 1790 Broadway, New York 19, N. Y. When inquiring specify 1955 on the convenient Reader Service slip opposite last page.



3-WAY FLOW CONTROL

at the cost of only 1 valve!

One ROCKWELL-Nordstrom Multiport Valve Eliminates 3 or 4 Ordinary Valves

Imagine how complicated . . . and costly . . . the installation above would be if separate by-passes and valves were needed for each line. But with Rockwell-Nordstrom Multiport valves, these complex switching operations become simple, foolproof and economical. The drawings below (just three of many combinations), show why one Multiport can replace three or four ordinary valves.

In addition to original installation savings, Multiport valves *continue* to save you money because they're ruggedly built to stay efficient. *Pressurized lubricant* which forms a positive, leakproof seal, also prevents friction wear for longer life at lower cost.

Rockwell-Nordstrom Multiport valves (and the *complete* line of Straightway valves) are available in semi-steel, steel, stainless steel, bronze and other corrosion resisting metals. Write for complete details: Rockwell Manufacturing Company, Pittsburgh 8, Pa. *Canadian Valve Licensee:* Peacock Brothers Limited.

ROCKWELL-Nordstrom VALVES

LUBRICANT SEALED FOR POSITIVE SHUT-OFF

When inquiring check 1956 opposite last page

185

Estimating Cork Insulation Thickness to Prevent Condensation

Data by MUNDET CORK CORPORATION

Nomograph by
BILL SCHREMP, Assistant Editor

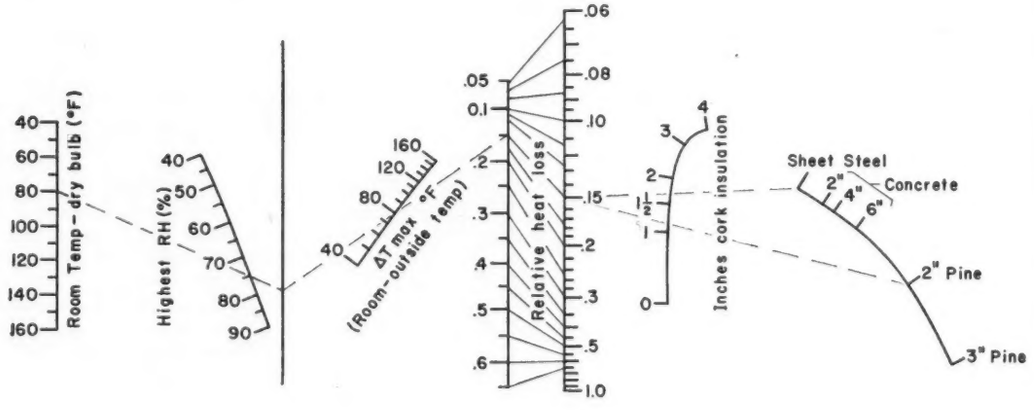
Where plant processes create a high relative humidity, plant walls and ceilings often "sweat" in cold weather. In order to prevent such condensation without dehumidifying, it is necessary to cut heat loss through the walls and roofs involved.

This nomograph is designed to show how much cork insulation is required, under specific conditions, to eliminate condensation. It considers moisture content of the air, temperature difference and thermal conductivity of the walls and ceilings.

Typical Example

In one plant operation a room temperature of about 80°F is maintained. Relative humidity rises to 75 percent, lowest outdoor winter temperature is 0°F. Plant roof is 2" pine, some sections of the wall are sheet steel, others 6" concrete. How much cork insulation is required to prevent condensation?

Align room temperature of 80°F with maximum relative humidity of 75 percent to find a point on the reference line. Align this point with maximum temperature difference (80 − 0°) of 80°F. This produces a relative heat loss figure of 0.15 on the left side of the heat loss scale. Follow the guideline through the modulus to the ring side of the heat loss scale to 0.15. Align this relative heat loss with the wall or roof description at right. It will be seen that the pine roof and 6" concrete walls can be adequately insulated with 1½ inches of cork. Sheet steel sections call for more than 1½ — probably 1¾ or 2" of cork.



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What's a "New Solution"?

It's an article in CHEMICAL PROCESSING describing a new way of solving a tough plant operating problem.

In each issue you will find specific "case histories" showing how these processing problems were solved.

Each article states the operating problem . . . explains the process used and gives details of how problem *was solved* . . . shows results secured.

Take a look at "New Solutions" articles in this issue — they might suggest a "solution" for some of your tough processing problems.

Wanted: Nomographs!

Each could earn $20!

Do you have a pet nomograph that could save time for other CHEMICAL PROCESSING readers? Send it to:

DATA EDITOR
CHEMICAL PROCESSING
111 E. Delaware Place
Chicago 11, Illinois

CHEMICAL PROCESSING pays $20 for each one accepted and published.

Tells facts about man-made rubber

Information on physical properties and processing of man-made "natural" rubber, including step-by-step pictures of production process, is contained in 26-page booklet. Charts give analysis of properties of "cold" non-oil polymers, "cold" oil-extended polymers, and "hot" polymers. Test recipes and test data are also included.

"Ameripol Rubber" is issued by Goodrich-Gulf Chemicals, Inc., Dept. CP, 3121 Euclid Ave., Cleveland 15, Ohio. When inquiring specify 1958 on form opposite last page.

Reports on insulation for pipe, fittings, refining towers

Information on combination inorganic silica and asbestos fiber insulation for pipes, fittings, and refining towers is contained in eight-page performance report and specifications manual. Characteristics and efficiency of insulation in 100 to 1600° range are described. Specifications for application cover various uses.

"Carey Alltemp" is issued by The Philip Carey Mfg. Co., Dept. CP, Lockland, Cincinnati 15, Ohio. Specify 1959 opposite last page.

Tells where and how to use pressure-sensitive tapes

Liberally illustrated, 68-page manual in loose-leaf style is a workable guide to selection of pressure-sensitive tapes for industrial applications. Cross indexing by tape type, function, or application enables user to find recommended pressure-sensitive product easily.

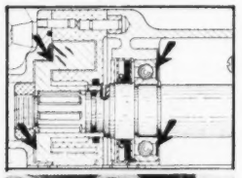
"Mystik Manual of Pressure Sensitive Products" is available from Mystik Adhesive Products, Inc., Dept., CP, 2635 N. Kildare, Chicago 39, Ill. Specify 1960 on form opposite last page.

WAUKESHA P.D.*
corrosive resistant pumps

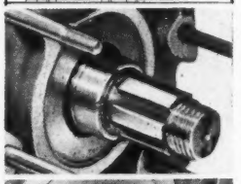
reflect
new performance features . . . no increase in cost!

In your industry, *Waukesha* is the only brand name that now stands for reliability in pumps. Greater time savings, cleanability, longer operational life, remarkably low maintenance costs — these are just a few of the important advantages your plant manager will consider *exclusive with Waukesha.*

New engineering brings the load on the impeller end of the shaft close to the ball bearings — a big factor in lessening shaft-slap and wear on impellers, body and cover . . . Larger, stronger shafts, more and huskier splines provide greater rigidity for the impellers . . . New stainless steel sleeve, easily cleaned and reversible (to double service-life) relieves shaft wear. Sleeve is slotted to fit a pin on the shaft so shaft and sleeve positively rotate together . . . A quick glance at the feature pictures at right will tell you more of the story.



Notice how close to the heavy duty ball bearings (arrow) the corrosion-resistant impellers are positioned (arrow).



Larger diameter shaft, more and larger splines reduce wear by giving greater rigidity to impellers.

Positioning pin on shaft for reversible stainless steel sleeve provide positive assurance that sleeve and shaft rotate together.

These are just a few of the 18 improvements that will keep your WAUKESHA PUMPS humming quietly, efficiently and more economically through a longer performance-life.

"WAUKESHA" is another word for dependability.

* Positive Displacement

ONLY *Waukesha* gives you a quarter century's experience and reliability

Send for the new 1957 Catalog. Jot down the applications you have in mind. Example: brewing — dairy — food processing — beverage. Just a postcard will do — but write today.

Waukesha FOUNDRY COMPANY

Dept. No. P-2 WAUKESHA, WISCONSIN

When inquiring check 1961 opposite last page

186

Cost of Pumping

By DUKE SILVESTRINI
Allis Chalmers Corp.
and
D. S. DAVIS
Professor of Engineering
University of Alabama

For liquids at temperatures where their viscosities are not greatly different from that of water at 68°F, the cost of pumping, C, in cents per 1000 gallons is given by

$$C = 0.315 \frac{PH\delta}{E}$$

where P = cost of power, cents/kw-hr
H = total dynamic head, ft
δ = specific gravity
E = over-all efficiency of motor and pump, %

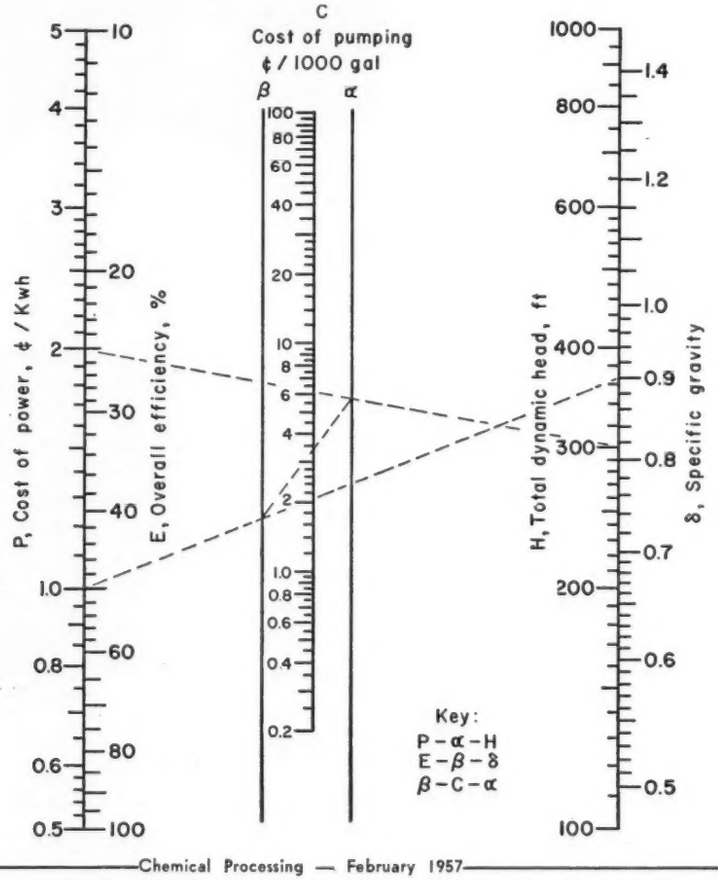
Accompanying nomograph, constructed by means of well-known methods[1] permits this equation to be solved readily and accurately.

Typical Example

What is the cost of pumping 1000 gallons of a liquid with a specific gravity of 0.900 that exhibits a viscosity near that of water at 68°F against total dynamic head of 300 feet if the over-all efficiency of motor and pump is 50 percent and power costs two cents per kilowatt-hour? Following the key on the chart, connect 2 on the P-Scale and 300 on the H-scale with a straight line. Mark the intersection with the α-axis. Connect 50 on the E-scale and 0.900 on the δ-scale with a straight line. Mark the intersection with the β-axis. Connect the intersections on the α- and β-axes with a straight line and read the desired cost of pumping on the C-scale as 3.4 cents per 1000 gallons.

LITERATURE CITED

(1) DAVIS, D. S. "Nomography and Empirical Equations," Chap 6, New York, Reinhold Publishing Corp., (1955)



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NOISE and PULSATION
Can Be Stopped
Scientifically!

NOISES from intake and discharge piping of air, steam and gas systems
and
PULSATION and VIBRATION caused by surge in compressor, blower and pressure reduction systems

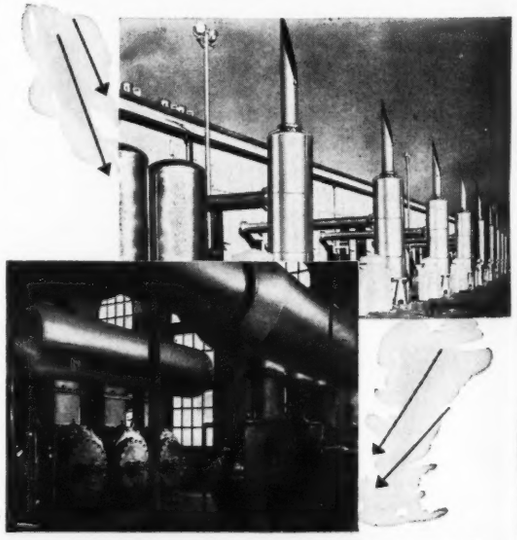
are effectively eliminated by
BURGESS-MANNING SNUBBERS

First, the B/M Snubbing Principle is scientifically correct and thoroughly proved in every branch of industry, and

Secondly, every Burgess-Manning Snubber is engineered to the specific application.

Burgess-Manning Snubbers attack noise and pulsation at the source. The pulse and slug of engine or compressor discharge is dissipated before it can be transmitted to atmosphere or other parts of the system. Elimination of the noise and pulsation problem will be money in your pocket through better equipment efficiency, improved production, reduced maintenance, elimination of operating hazards that result in costly errors, and improved neighbor and labor relations.

We invite you to present your problems for recommendations.



Write for free copies of case histories of representative installations and see proof of results.

BURGESS-MANNING COMPANY
Sound Engineering 721 East Park Avenue, Libertyville, Illinois
Dallas, Texas

When inquiring check 1962 opposite last page

Data on six plastics

Information to help designers, engineers, and fabricators choose the right plastic for the job is provided in 16-page booklet. Epoxies, phenolics, polyesters, polyethylenes, styrenes, and vinyls are described. Distinguishing characteristics, fabricating techniques, and major fields of application are defined for each group.

"1957 Condensed Reference File" is issued by Bakelite Co., Div. of Union Carbide and Carbon Corp., Dept. CP, 30 E. 42nd St., New York 17, N.Y. When inquiring specify 1963 on form opposite last page.

Lists data for diaphragm valves and controllers

Illustrated catalog of 28 pages lists design and construction features, materials specifications, and inner design of manufacturer's diaphragm motor valves. All types available, along with sizing data, are shown. Manufacturer's line of controllers is also shown and described.

Cat 256 MVC is issued by Garrett Oil Tools, Inc., Dept. CP, PO Box 2427, Longview, Texas. When inquiring specify 1964 on form which is located opposite last page.

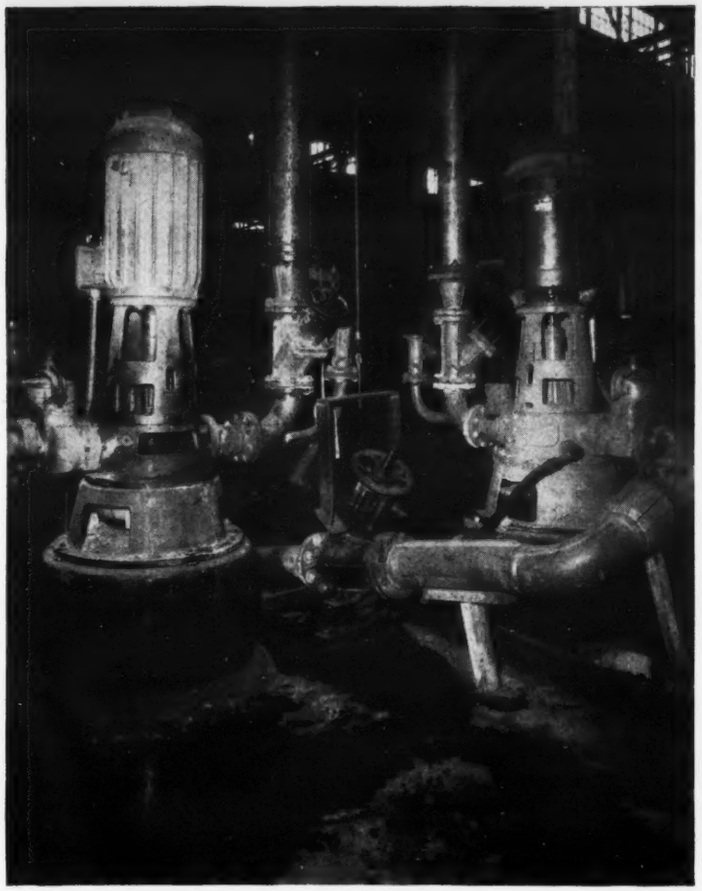
Natural rubber technology: recent developments

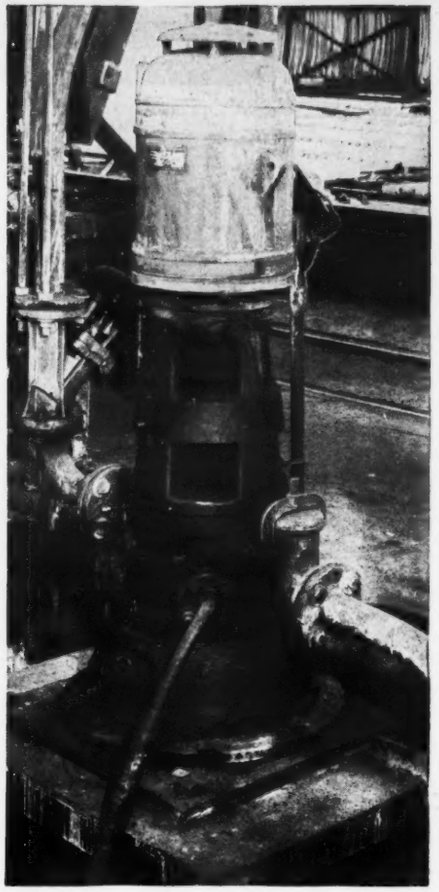
Technology of natural rubber is on the move. The status of technological advances in the fields of peroxide vulcanization, fluid rubber compounds, Arctic rubbers, anti-ozonants, superior-processing rubber, cyclized rubber, Heveaplus, resin reinforcement, and oil extension is reviewed in detail in "Rubber Developments" (Aug 1956), vol 9, no. 3, issued by Natural Rubber Bureau, Dept. CP, 1631 K St., NW, Washington 6, D.C. When inquiring check 1965 on form opposite last page.

Wire rope assemblies

Preformed wire rope, with a terminal fitting attached to one or both ends, is the subject of 24-page catalog. Fittings can be threaded stud, oval eye, pin eye, clevis, hook, fork, or turnbuckle. All dimensions, drawings, capacities, and sizes of both terminals and wire rope are included.

Cat 5601 is issued by MacWhyte Company, Dept. CP, Kenosha, Wis. When inquiring specify 1966 on form opposite last page.





"Almost No Maintenance" Since 1947

Back in 1947, Canadian Copper Refiners Limited installed a Type G LaBour packingless pump to handle electrolyte at their Montreal East refinery. Performance has been completely satisfactory, says the plant management, with almost no maintenance. In 1955 this company installed three more Type G LaBours and reports "similar satisfactory performance" from the newer units.

This experience is typical of many. Chemical men who have had LaBour pumps actually working for some time are best informed, and they usually insist on LaBours when it comes to expansion or replacement of older equipment. These men know that true economy in pumping comes only from dependable, day-in day-out service—the kind of service for which LaBour Pumps are recognized all over the world.

If you've had no direct experience yourself with LaBour pumps, we urge you to consult those who have. We'll be glad to help you.

ORIGINAL MANUFACTURERS OF THE SELF-PRIMING CENTRIFUGAL PUMP

LABOUR

THE LABOUR COMPANY, INC. • Elkhart, Indiana, U.S.A.

When inquiring check 1967 opposite last page

Valve Flow Coefficient

D. S. DAVIS
Professor of Engineering
University of Alabama

Recent data[2] on Crane unlined "Y" pattern diaphragm valves (screwed and flanged end — forward or reverse flow) cover valve flow coefficients in gallons of water at 60°F that flow through the valve under a presure drop of one psi when the percentage of total lift is known.

Accompanying line coordinate chart, constructed by well-known methods[1], extends the utility of the original data.

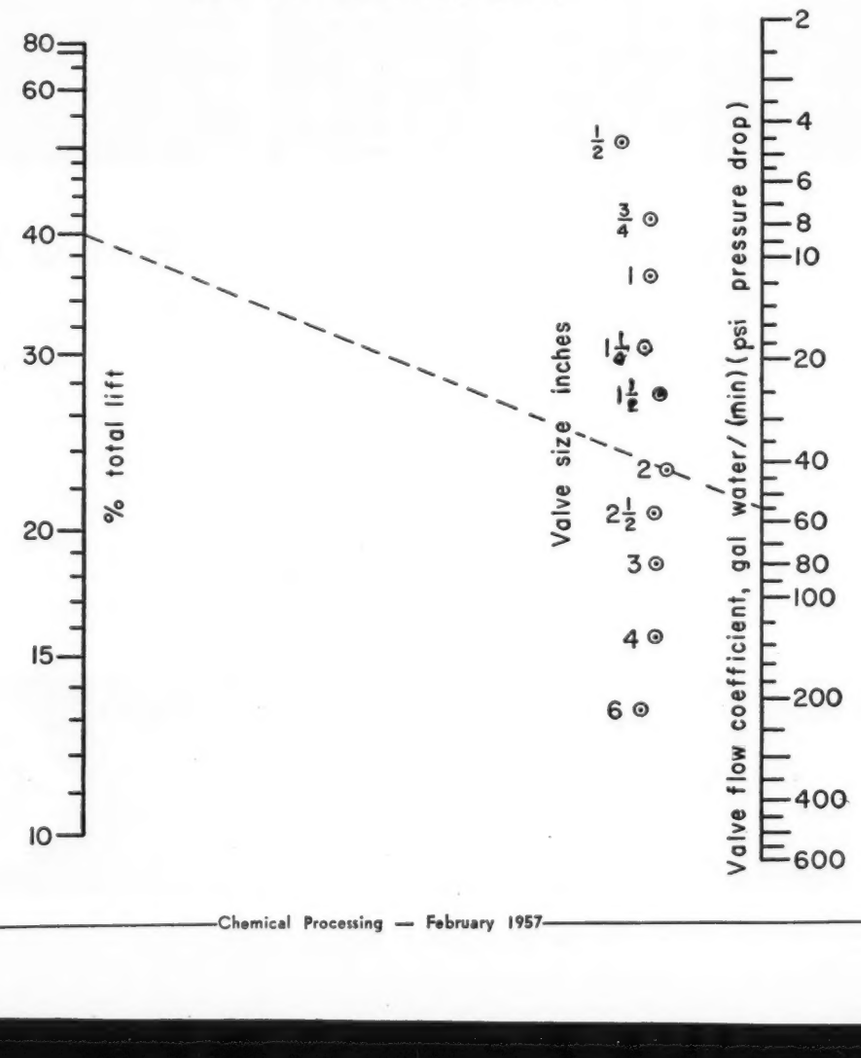
Typical Example

At 40 percent of total lift, what is the flow coefficient for a 2-inch diaphragm valve? Connect 40 on the scale for percentage of total lift and the gage point for the 2-inch valve with a straight line. Read the valve flow coefficient on the scale at the right as 55 gpm of water when the pressure drop is one psi.

LITERATURE CITED

(1) DAVIS, D. S., "Nomography and Empirical Equations," Ch 10, Reinhold Publishing Corp., New York, (1955)

(2) *Crane Valve World*, No. 3, p. 70 (1956)



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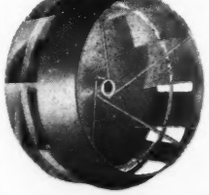
in "BLUE CHIP" PLANTS it's

GARDEN CITY FANS

• for better performance
• lower maintenance costs

Nabisco's new Chicago Bakery . . . Largest bakery plant in the world

- RUGGED CONSTRUCTION with heavy duty steel endures longer
- COMPACT housings makes for simple installation directly into duct work
- AIR-COOLED SHAFT of high temperature fans saves bearings
- IMPROVED BLADE DESIGN for each fan model means higher efficiency
- PROVEN PERFORMANCE in America's top industrial plants



NOL (Non-Overloading) Backward Curve Wheel

HSH (Heavy Duty) Material Handling Wheel

TEAR THIS OUT—a reminder to WRITE FOR FREE CATALOG . . . AND LIST OF "BLUE CHIP" USERS

Write today for free brochure giving full information

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ESTABLISHED 1879

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Dept. P

Representatives in Principal Cities

• Fans for Industry • Backward Curve • Forward Curve
• Material Handling • Radial Bladed • Small Exhaust

Tells of all-electric valve control for modulating, regulating

General data on adaptability, sensitivity, and maintenance is contained in eight-page bulletin on all-electric valve control designed for handling such process variables as pressure, liquid-level, flow, temperature, and others. Block diagrams show types of control systems. Chart lists dimensions and capacities.

Bul E-1156 is issued by E-I-M Company, Inc., Dept. CP, 1340 Old Spanish Trail, Houston 25, Texas. Specify 1969 opposite last page.

Describes over 375 products of chemical manufacturer

More than 375 basic industrial, agricultural, and pharmaceutical chemicals are contained in manufacurer's 40-page, indexed catalog. Detailed descriptive information is presented in tabular form. Included are coating materials, flotation and flocculating agents, glycols and glycol ethers, halogenated organic compounds, ion exchange resins, magnesium alloys, Methocel, organic chelating agents, inorganic and organic acids, plastics and titanium, and other organic and inorganic compounds.

Product catalog is issued by Technical Service and Development, Dow Chemical Company, Dept. CP, Midland, Mich. When inquiring specify 1970 on form opposite last page.

Describes laboratory connectors

Four-page bulletin illustrates connecting and valving devices for making and breaking joints, adding and removing parts, and stopping or renewing flow of liquids, gases, or vapors. Neoprene and silicone seals fit glass or metal sockets.

Bulletin 832 is issued by Burrell Corporation, Dept. CP, 2223 Fifth Ave., Pittsburgh 19, Pa. Specify 1971 opposite last page.

Control without relays — fundamentals & features

Basic principles and the logic function concept in static sequence control systems are explained in eight-page bulletin. Systems operate without use of relays. Photographs and circuit diagrams aid in the discussion.

Bul GEA-6578 is issued by General Electric Co., Dept. CP, Schenectady 5, N. Y. When inquiring specify 1972 opposite last page.

AN IMPORTANT MESSAGE

to the customers and friends of Read Standard Corporation

Effective November 3, 1956, the Read Standard Corporation, 50-year-old manufacturer of Readco bakery and chemical processing equipment and Standardaire blowers, merged with and became a division of Capitol Products Corporation.

WHAT IS CAPITOL PRODUCTS CORPORATION?

Capitol Products Corporation is a young, progressive organization specializing in light metals fabrication. Principally, Capitol manufactures extruded aluminum products for the building industry. To date, this organization has enjoyed great success in both the manufacturing and marketing phases of its industry. For instance, in the highly competitive aluminum door business Capitol has become, in four years, the world's largest producer. This management now directs the Read Standard operation.

WHAT THIS MERGER MEANS TO YOU.

To you who know and have dealt with Read Standard, the merger means simply this . . . extensive research and development not only along present but completely new lines . . . broadened engineering, service and sales staffs to better handle your needs . . . and improved manufacturing facilities. As in the past, Read Standard will maintain office and plant operations at its location in York, Pa. Theodore F. Freed will be Vice President and Divisional Operations Manager of this Division.

To you whom we have served in the past, we wish not only to express our sincere appreciation but to affirm our policy. The prime objective of this Corporation is to make available to you the very best equipment and services that the ingenuity, modern research and manufacturing facilities of our combined operations can provide.

CAPITOL PRODUCTS CORPORATION

Eugene Gurkoff

Eugene Gurkoff
President

When inquiring check 1973 opposite last page

Dilution of Caustic Soda Solution

D. S. DAVIS
Professor of Engineering
University of Alabama

Immediately on delivery, tank-car shipments of 73 percent caustic soda solution are usually diluted to 50 percent by introducing water at the proper rate into the side opening of a mixing tee through which the original concentrated solution is being pumped. Since considerable heat is evolved on dilution, temperature of the diluted caustic soda solution as it leaves the mixing tee can be used to control rate of water addition when temperatures of concentrated solution and of water are known.

Accompanying line coordinate chart, constructed from recent data[2] by means of well-known methods[1], shows the relationships for three temperatures.

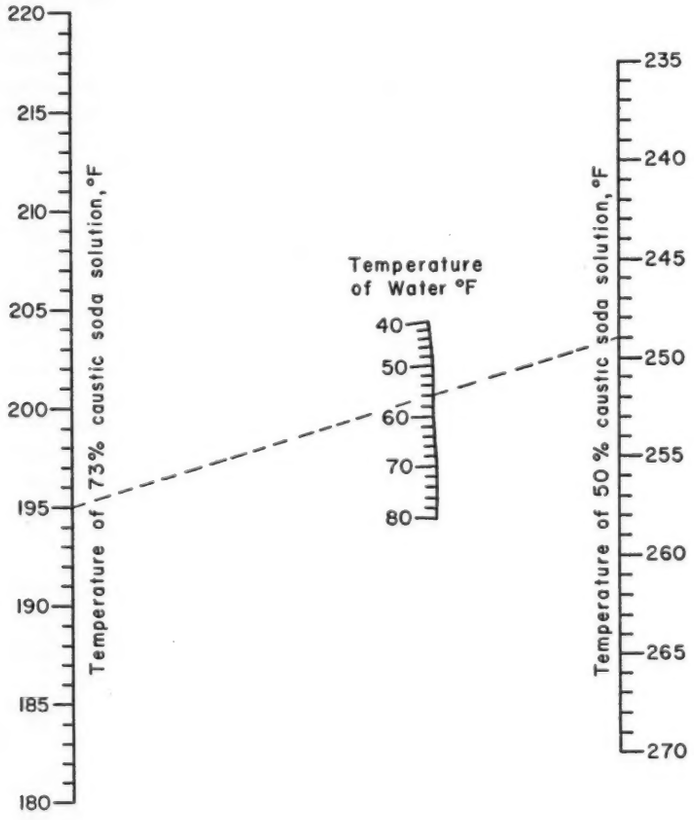
Typical Example

When 73 percent caustic soda solution at 195°F is diluted with 56°F water, what temperature of the resulting solution would indicate a concentration of 50 percent? Connect 195 on the scale at the left and 56 on center scale with a straight line. Read proper temperature of 50 percent caustic soda solution as 249°F on scale at right.

LITERATURE CITED

(1) DAVIS, D. S., Nomography and Empirical Equations," Chap 10, New York, Reinhold Publishing Corp., (1955)

(2) Hooker Electrochemical Company, "Caustic Soda," Technical Service Bulletin 102, p 16, Niagara Falls, N. Y., (1956)



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MACWHYTE
PREformed WIRE ROPE

★ Stainless Steel
★ Monel Metal
★ Plastic Coated

Macwhyte Corrosion-Resisting Wire Ropes are made in Stainless Steel, Monel Metal and Plastic Coated Rope, in a variety of sizes and constructions which provide a variation in flexibility and strengths to meet service requirements.

Recommendations and prices will be given upon request.

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Manufacturers of Internally Lubricated PREformed Wire Rope, Braided Wire Rope Slings, Aircraft Cables and Assemblies, Monel Metal, Stainless Steel Wire Rope, and Wire Rope Assemblies. Special catalogs available.

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When inquiring check 1974 opposite last page

Test results on exterior paints containing acrylic emulsion

Detailed information on various exterior paint formulations containing acrylic emulsion is tabulated in 48-page report. Tests were made on experimental paints designed to permit study of variables which affect outdoor durability. Report gives summary of conclusions in tests regarding chalking, dirt pick-up, whiteness and color retention, mildew and mold, erosion, cracking and flaking, extenders, and effect of substrate. Tables illustrate specific factors such as resistance to staining by metal or effect of substrate on durability.

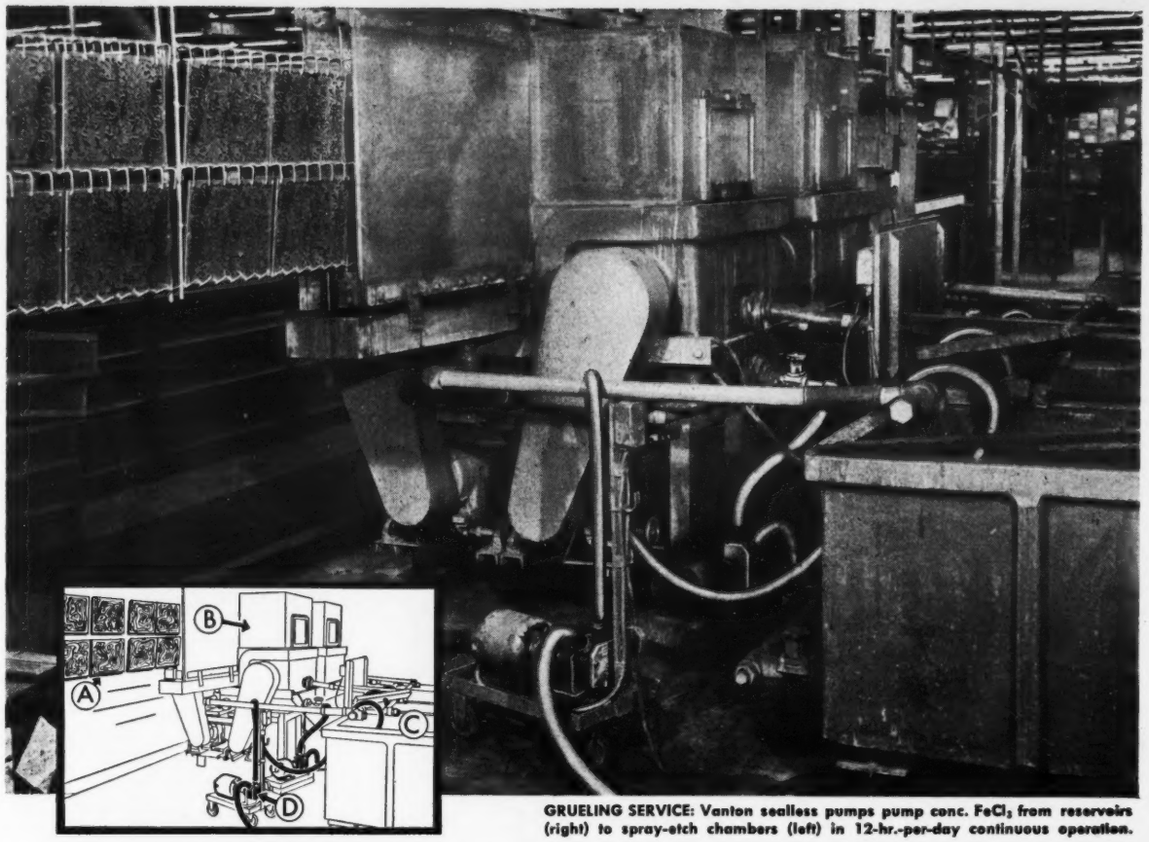
Progress Report 3 is issued by Rohm & Haas Company, Dept. CP, 712 Locust St., Philadelphia 5, Pa. When inquiring specify 1975 on form opposite last page.

Describes manufacturing facilities for heat exchanger tube

Facilities for manufacturing heat exchanger, condenser, and other copper and brass tube, pipe, and rod are graphically described in six-page bulletin. Illustrations show operations of 45-acre plant where copper is refined, cast into billets, and drawn into sizes ranging from 1/8 to 9" OD.

"The Lewin-Mathes Story" is issued by Lewin-Mathes Co., Dept. CP, 1111 Chouteau Ave., St. Louis 2, Mo. Specify 1976 opposite last page.

Thanks to E. B. Wallace, Shell Chemical Co., Deer Park, Texas, for the idea of this cartoon.



GRUELING SERVICE: Vanton sealless pumps pump conc. $FeCl_3$ from reservoirs (right) to spray-etch chambers (left) in 12-hr.-per-day continuous operation.

at WESTINGHOUSE's TV-Radio plant in Metuchen, N. J.

3 Vanton Sealless Pumps minimize maintenance problems in pumping ferric chloride for printed-circuit etching

PRINTED-CIRCUIT PROCESS — Copper foil laminated to baseboard has circuit diagram silk-screened with acid-resistant ink (A). Conveyed into etching equipment (B), excess copper foil not covered by resist ink is etched away by warm conc. $FeCl_3$. Later, vapor degreaser removes acid-resistant ink, exposing remaining copper circuit.

PUMPING PROBLEM—$FeCl_3$ is pumped continuously from reservoirs (C) (overflow return), to provide fresh liquor for spray-etch chambers. Before Vanton came on job, high corrosiveness of $FeCl_3$ and abrasiveness of crystals caused much trouble with conventional pumps. Leakage at packing caused crystallization, with abrasion and scoring of pumpshafts, and expense and nuisance of increased maintenance.

VANTON SOLUTION — When Westinghouse changed to Vanton sealless pumps, these packing problems ceased. Each of 2 etch chambers has its own Vanton pump delivering $FeCl_3$ from its reservoir. Third Vanton pump (D, foreground) is movable auxiliary, used for cleanout of etch-spray chambers and reservoirs when $FeCl_3$ batch is exhausted. Vanton plastic materials of construction eliminated the problem of corrosion. A bakelite body block and natural rubber flex-i-liner proved completely impervious to the $FeCl_3$. Maintenance was reduced to the infrequent and simple replacement of the inexpensive flex-i-liner.

HOW VANTON PUMP WORKS • Liquid flows in channel between molded plastic body and synthetic flex-i-liner (*1*). No liquid touches metal. Liner flanges secured to plastic body block by bolted face plates (*2*). • Pumping mechanism is rotor mounted on eccentric shaft (*3*). At each revolution it pushes liner against body block and sweeps a "slug" of liquid around the circular track from inlet to outlet. • All bearings are outside of fluid area and located within protective stainless steel assembly in the event of flex-i-liner failure (*4*). • Liners are replaced in minutes, with pump in place, by simply removing face bolts and face plate, slipping old liner out, new one in (*5*).

CHECK THESE VANTON SEALLESS PUMP ADVANTAGES!

- No stuffing box or mechanical seal to leak, contaminate, or require maintenance.
- Self priming; high vacuum.
- A full-time production tool.
- Broad capacity range, 1/2-20 GPM.
- Available in 7 body and 10 flex-i-liner materials, to handle a wide variety of corrosives and abrasives.

SEND COUPON FOR FACTS!

Vanton Pump & Eqpt. Corp., Hillside, N. J. Dept. CPF-1

My pumping problem is.....

NAME.....

TITLE.....

COMPANY.....

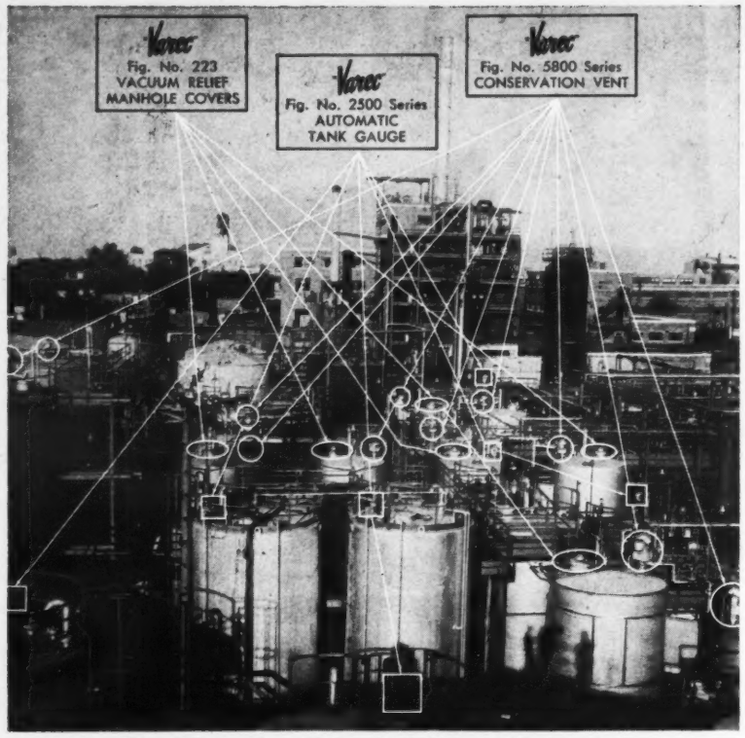
ADDRESS.....

CITY.....STATE.....

VANTON PUMP and Equipment Corp. • Hillside, N. J.

DIVISION OF COOPER ALLOY CORP.

When inquiring check 1977 opposite last page



Photo—Courtesy of Barrett Division—Allied Chemical and Dye Corporation

GOOD MANAGEMENT Recognizes the Value of GOOD TANK EQUIPMENT

A glance at the above photo of the Philadelphia plant of the Barrett Division of the Allied Chemical & Dye Corporation reveals dozens of storage tanks equipped with "Varec" Conservation Vent Units, Pressure and Vacuum Relief Manhole Covers, and Automatic Tank Gauges.

Here is practical evidence of the important role "Varec" storage tank equipment plays in the industrial scene. "Varec" Figure No. 5800 Series Conservation Vent Unit affords the greatest protection for venting inflammable liquid storage. Flame Arrester, Figure No. 50, is listed by Underwriters' Laboratories for use on oil storage tanks and approved by Associated Factory Mutual Laboratories for use on chemical storage.

"Varec" Figure No. 2500 Series, Automatic Tank Gauge, furnishes accurate liquid level gauging to plus or minus ⅛ inch. These gauges can be mounted with "Varec" PULSE CODE Transmitters to convert to a "Varec" PULSE CODE Telemetering System. This provides for remoting liquid level, temperature, motor valve or other equipment status, abnormal or alarm conditions and other data as required. Contactor units to supply "on - off" remote control of equipment such as pumps, motor-driven valves, etc., are available.

If your problem concerns the safety or control of your process, you can profit by sending for "Varec" P-7R Catalog.

"Varec"

THE VAPOR RECOVERY SYSTEMS COMPANY
2820 North Alameda Street
Compton, California

Cable Address:
Varec Compton California (U.S.A.) All Codes

961-19

When inquiring check 1978 opposite last page

NEW LITERATURE

Shows applicator machine for plastic fitments

Plastic fitment applicator designed to operate independently or with screw capper machine is shown in two-page, two-color catalog sheet. Detailed line drawing demonstrates operation of machine.

"Plastic Fitment Applicator Machine" is issued by Resina Automatic Machinery Company, Inc., Dept. CP, 572 Smith St., Brooklyn 31, N. Y. When inquiring specify 1979 on form which is located opposite last page.

Fire investigation facilities made available

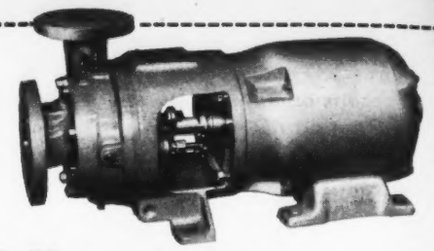
Booklet of 18 pages describes facilities of fire- and explosion-investigation laboratory being made available on contract basis. Company's program has been expanded to undertake development in other fields, particularly in hydraulics, heat transmission, combustion processes, and auto-oxidation.

"Research and Testing" is issued by Factory Mutual Laboratories, Dept. CP, PO Box 510, Norwood, Mass. When inquiring specify 1980 on form opposite last page.

Describes demineralizer for laboratory use

Illustrating laboratory unit for demineralizing tap water, two-page bulletin in two colors lists features and price data. Unit described produces water of high ionic purity comparable to water obtained by three distillations.

Form 501 DZ is issued by Crystal Research Laboratories, Inc., Dept. CP, 29 Allyn St., Hartford 4, Conn. When inquiring specify 1981 on the convenient Reader Service slip opposite last page.



full capacity pumping power

There's maximum performance with space-saving compactness in the design of Ingersoll-Rand's Motorpump. Capacities from 5 to 2800 gpm . . . heads to 650 feet. Easy installation. Precision manufacturing means dependable, smooth operation.

For your liquid-moving problems . . . Send for I-R's catalog on Motorpumps.

Ingersoll-Rand
11 Broadway, New York 4, N.Y.

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When inquiring check 1982 opposite last page

PREVENT BREAKS AND LEAKS IN CONNECTIONS AND VALVES due to WATER HAMMER

with Josam **SHOCK ABSORBERS**

● The pounding, shaking noise that occurs repeatedly in many pipe lines is "Water Hammer" — as destructive as it is noisy — loosening fittings, damaging valves, connections and appliances, and causing extensive repairs! JOSAM SHOCK ABSORBERS easily, inexpensively and permanently prevent hammering and vibration in pipe lines.

Write for free literature and latest scientific data.

JOSAM MANUFACTURING COMPANY
Dept. CP-2 Michigan City, Indiana
Representatives in all principal cities.
Josam products are sold through plumbing supply wholesalers.

When inquiring check 1983 opposite last page

Chlorosulfonic acid bibliography, data

Technical information on a high quality (99.4%) chlorosulfonic acid with <5.0 ppm, is presented in this 24-page manual. Existing and potential uses, supply, handling and service, corrosion, toxicity, and safety of the compound are given in detail. A very complete bibliography on the subject is included: there are more than 130 abstract references.

"Chlorosulfonic acid" is issued by Inorganic Chemicals Div. Monsanto Chemical Co., Dept. CP, St. Louis 1, Mo. When inquiring check 1986 on the convenient Reader Service slip which is located opposite last page.

Simple methods for analyzing plating solutions

Prefaced by a discussion of analytical principles, use of apparatus, and methods for sampling a plating solution, 36-page bulletin outlines in detail necessary steps involved in 28 analytical methods. Analyses for testing nickel, copper, silver, and other metal-finishing solutions are included. Necessary equipment, component chemicals of solutions, atomic weights, acid concentrations, and electrochemical data are included. Bulletin also contains conversion tables. Photographs show different test operations performed.

"Simple Methods for Analyzing Plating Solutions" is issued by Hanson-Van Winkle-Munning Co., Dept. CP, Church St., Matawan, N. J. When inquiring specify 1987 on form which is located opposite last page.

Tells how aluminum jacketing materials, methods, cut costs

Information on aluminum insulation jacketing materials and methods is divided into three parts in 40-page manual. Part I tells how jacketing improves appearance, gives longer life, and reduces costs. Part II covers recommended materials and methods for pipe, vessel, and head jackets, fasteners, tank roofs, flashings, and others. Part III contains typical application specifications, corrosion resistance of aluminum alloys, tips on handling, jacketing computation tables, and properties of recommended alloys.

Manual on aluminum insulation jacketing materials and methods is available from Process Industries Dept., Kaiser Aluminum & Chemical Sales, Inc., Dept. CP, 919 N. Michigan Ave., Chicago 11, Ill. When inquiring specify 1988 on the convenient Reader Service slip which is located opposite last page.

Looking for a Better... MORE ECONOMICAL HEAVY REINFORCING NECK?

SPECIFY LENAPE TYPE H

- Superior, seamless construction assures maximum strength.
- Straight through pipe schedule bore eliminates turbulence shoulder of standard necks . . . greater resistance to corrosion.
- One piece, forged neck eliminates reinforcing pad and extra welding.
- Only one wrench required when O.D. is made to nut stop dimensions. Optional nut relief illustrated.
- Pound for pound—the Lenape Type "H" is actually less expensive than standard necks.

Full details are found on pages 7, and 16 to 19 of Lenape Catalog 10-53.

LENAPE HYDRAULIC PRESSING AND FORGING CO.

LENAPE HYDRAULIC PRESSING & FORGING CO. DEPT. 100 WEST CHESTER, PA. RED MAN PRODUCTS

When inquiring check 1984 opposite last page

get this FREE BOOK TODAY!

ALL ABOUT ENVIRONMENTAL TEST EQUIPMENT

This 20 page digest of the M & M line of environmental test equipment gives you quick facts on the application, performance and economies of Murphy & Miller equipment. Illustrates and describes the industry's most modern units—provides tips on selection and use of all types of environmental test units. Write for it today.

MURPHY & MILLER, INC.
1340 South Michigan Avenue
Chicago 5, Illinois

When inquiring check 1985 opposite last page

MORSE DeLUXE 500 Portable ROTATOR

- MIXES
- BLENDS
- TUMBLES
- CLEANSES

Faster and at less cost!

The patented Morse De Luxe 500 Rotator will handle 1 to 55 gal. containers, weighing to 500 lb. They revolve safely, smoothly, efficiently at 10, 20, 40 rpm on this powerful, compact, portable, motorized unit. Cuts cost of mixing, blending, tumbling, cleansing. Easily moved and loaded by one man. Has ¾" dia. power driveshaft with self-aligning ball bearings. Four adjustable 4" dia. Neoprene-tread drive wheels. Fully enclosed worm-gear drive with 30-1, 15-1, 7½-1 reductions. Weighs 137 lb. Delivered complete with motor, drive mechanism and tipping lever. Write for Bul. #1053 and catalog, showing full Morse line of Drum and Barrel handling equipment.

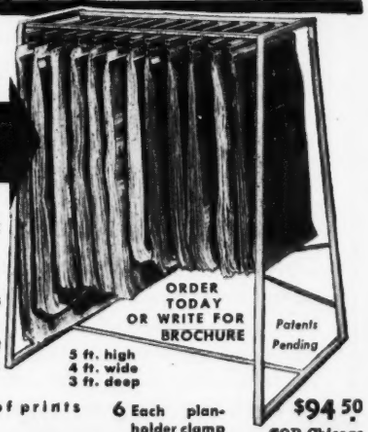
MORSE MANUFACTURING CO. INC.
757 West Manlius St. East Syracuse, N. Y.

When inquiring check 1989 opposite last page

Glider BLUE PRINT RACK

FOR ARCHITECTS, ENGINEERS, CONTRACTORS & FACTORIES

NOW EASY TO FILE... EASY TO FIND... YOUR BLUE PRINTS



20 Exclusive Features: including:

1 No holes to punch.
2 Insert sets of prints easily.
3 Replace any sheet without removing other sheets.
4 Various sizes of prints accommodated.
5 No protruding ends of clamps.
6 Each plan-holder clamp holds from 1 to 100 prints.
7 The "Glider" can hold 12 to 18 sets.
8 Clearly visible index shows location of sets.
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$94.50 FOB Chicago including 12 plan holders

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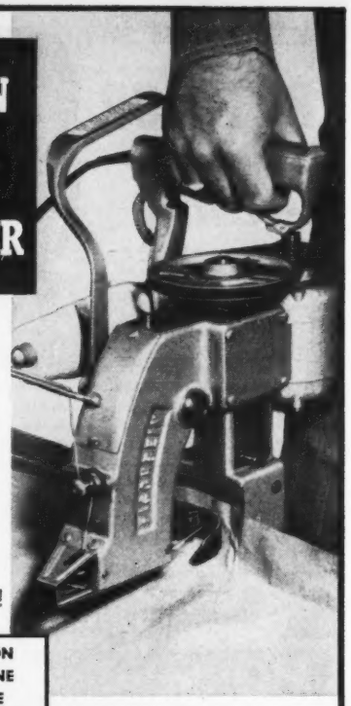
FISCHBEIN
Portable
BAG CLOSER



HANDLES ALL TYPES OF BAGS!

- Total weight: 10½ lbs.
- Requires no installation . . . plug into any outlet
- Simple to operate and maintain
- Lowest priced bag closer on market

FULLY GUARANTEED!

OPTIONAL SUSPENSION UNIT ADAPTS MACHINE TO STATIONARY USE

***NEW!* FOR CLOSING SMALL BAGS!**

FISCHBEIN TABLE MODEL CARRIAGE CONVEYOR (Model FS)

One simple knob locks any Fischbein Portable Bag Closer into proper sewing position. Carriage slides freely and returns automatically to starting position, ready for next bag.

UNIQUE VERSATILITY! Any Fischbein Bag Closer can be used 3 different ways!

1. Completely portable
2. Suspended with counterbalance
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FOR DETAILS, MAIL THIS COUPON TODAY!

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2730 30th Ave. S., Minneapolis 6, Minn., U.S.A.

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Firm Name_____
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City_____ Zone____ State_____

When inquiring check 1991 opposite last page

NEW LITERATURE

Improved heat exchangers have U-spring scraper

Improved line of shell-and-tube heat exchangers is described in four-page bulletin. Featured improvement is the new U-spring scraper which continuously cleans the inner heat transfer surfaces. Other improvements in equipment are pointed out, and drawings show details.

Bul PE-2 is issued by Henry Vogt Machine Co., Dept. CP, PO Box 1918, Louisville 1, Ky. When inquiring specify 1992 on form which is located opposite last page.

Detailed report covers vinyl acetate

Physical properties, grades, specs, handling of vinyl acetate monomer are covered in this detailed, 20-page bulletin.

"Vinyl Acetate Monomer" is issued by Air Reduction Chemical Co., a div. of Air Reduction Co., Inc., Dept. CP, 150 E. 42nd St., New York 17, N.Y. When inquiring check 1993 on form opp. last page.

Steel strapping story told in 36 pages

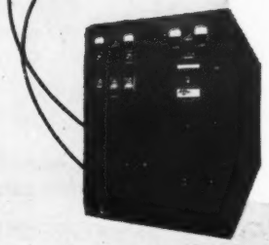
Over 130 applications of steel strapping, ranging from light parcel post reinforcement to packaging of sheet steel and lumber, are pictured in 36-page pocket-size booklet. Review of manufacturer's products includes hand and semi-automatic strapping machines, stretchers, cutters, dispensers, clips, sealers, and auxiliary equipment. Historical and technical data are presented.

"Blue book of Packaging #3" is issued by Gerrard Steel Strapping Division, United States Steel Corp., Dept. CP, 2915 W. 47th St., Chicago 32, Ill. When inquiring specify 1994 on form opposite last page.

Sel-Rex **GERMANIUM RECTIFIERS** *give you*

Dependable Power
top efficiency . . . up to 96% . . . for the life of the unit!

Where You Need It!
unaffected by corrosive atmospheres — can be installed alongside work



Completely sealed! Liquid cooled! Impervious to corrosive atmospheres! No costly "distant" installations . . . no bolting or alignment to bother with. Sel-Rex gives you more kilowatts of *maintenance-free power* per dollar invested. Single units 25 to 50,000 amperes — "custom engineered" to your specific requirements — all types of fully automatic and remote controls.

Write Dept. CP-2

NEMA

SEL-REX CORPORATION
(Rectifier Division)
155 Manchester Place Newark 4, N.J.
Distributor Inquiries Invited

When inquiring check 1995 opposite last page

Regulates Corrosive Gases

This 30" wafer type butterfly valve has a rubber-lined valve body, rubber-covered disc and stainless steel shaft; made for compact installation in line carrying corrosive gases.

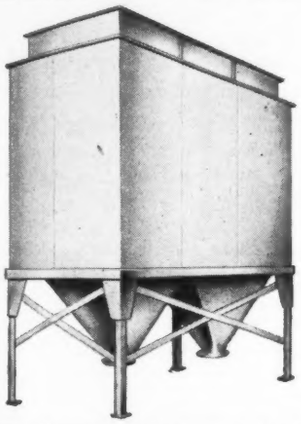
This is but one of many W. S. Rockwell standard and special flanged butterfly and wafer butterfly valves that meet any condition of pressure, temperature, corrosion or abrasion. Made in sizes from 4" to 144" of any metal, rubber-covered synthetic resin or glass-coated metal. For regulating, throttling or shut-off of air, gases, liquids or solids, no matter how "tough" the operating conditions. Minimum pressure drop. Non-clogging, self-cleaning. Furnished with any manual or automatic operators. Write for Catalog.

W. S. ROCKWELL *Butterfly Valves*

W. S. ROCKWELL COMPANY — 2207 Eliot Street, Fairfield, Connecticut
BUTTERFLY VALVES • SLIDE VALVES • AUTOMATIC VALVES

When inquiring check 1996 opposite last page

UP TO 75% LOWER INSTALLATION COSTS —99.9% EFFICIENCY with KOPPERS Series 12 Aeroturn Dust Collectors



50% Lower Maintenance Costs ... up to 50% Less Space!

AEROTURN reduces plant maintenance and operating costs! Shop housekeeping decreases . . . machinery wear from airborne dust and abrasive matter lessens . . . plant heating and cooling costs drop . . . employee and community relations improve . . . because Koppers Series 12 AEROTURN performs with highest efficiency! Yet, AEROTURN costs you less—less to install . . . less to maintain . . . less to operate.

It requires less space than comparable volume dust collectors . . . and reverse air jet filter cleaning permits continuous, automatic operation.

Series 12 AEROTURN Collectors range from 1,000 to 60,000 CFM . . . contain from 4 to 64 felt filter bags.

Packaged Koppers Model D AEROTURN Dust Collectors combine Series 12 features with unusual compactness . . . range from 500 to 4,800 CFM.

KOPPERS

Koppers Company, Inc.
Metal Products Division
Industrial Gas Cleaning Dept.

AEROTURN DUST COLLECTORS

Engineered Products
Sold with *Service*

—Mail this coupon today!—

Koppers Company, Inc., Industrial Gas Cleaning Dept., 5302 Scott St., Baltimore 3, Md.
Gentlemen: Please send me a free copy of your booklet on ☐ Series 12 ☐ Model D.

Name---------- Title----------
Company----------
Address----------
City---------- Zone------ State------

When inquiring check 1997 opposite last page

Technical Writing

(*Continued from page 9*)

Long years ago I had a man in my organization who felt somehow or other that his work was a little different from that of his associates. Whereas they could get their quarterly reports into two or three pages, his work was of such a character that he needed ten pages, plus tables and figures. Remonstrating with him got nowhere. I still got ten to thirty page reports from him, contrasted with two or three page reports from those that got the point. This man's reports were probably interesting and excellent. I wouldn't know; I never read one.

Any full report, with effort on the author's part, can be boiled down to tell 90 percent of the story in 25 percent of the words, and tell it more interestingly. And isn't it better to tell 90 percent to an interested and appreciative listener than to tell 100 percent to the empty air? Somebody, of course, will be interested in the other 10 percent, but as some of your discussion leaders will undoubtedly tell you, this can be put in an appendix, to be taken or let alone.

Before we leave brevity, let's admit that it can be overdone. I had a boss once who had the theory that no letter should be more than two paragraphs, or seventeen lines, long. He practiced his theory assiduously. It didn't take long to read his letters but it sometimes took much longer to try to figure out what he meant. My mind goes back to some very interesting mix-ups resulting from a misinterpretation of what he did mean. It is all right to boil down our writing to the essentials but let's not skip the essentials.

If the report is to sell something, a recommendation, an idea, or even a point of view, it must be convincing. The author may be drawing the conclusion that the moon is made of green cheese. It isn't enough for him to say it, or even to say that his data prove it. The boss may not believe it. He is unwilling to park his own brains outside while he reads the report. On the contrary, he usually wants to be led step by step through the argument and prove to himself that the conclusion is inescapable and that his previous opinion that the moon is made of something else is definitely wrong. It is not only just human, it is his job, to look for flaws in the logic. If certain steps in the reasoning appear to be glossed over, the report in his opinion is deficient and he is not convinced.

Just one or two inaccurate statements in a report may interfere seriously with the conviction that it should inspire. They are something to shun like the plague. If you must put in scuttlebutt, label it so, that the reader may believe it or not at his own risk.

One of the more subtle forms of inaccuracy is the unsupported or questionable assumption. I once asked a mathematician to figure out a rather involved engineering calculation for me. After I had explained

(*Please turn to next page*)

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Technical Writing

(*Continued from preceding page*)

the problem, he took it away and came back in a day or two with several sheets of calculations and a very nice answer. On following through his calculations with him, I pointed out that he seemed to have missed a factor which might be quite important. His reply was, "Oh yes, I didn't know the value of that coefficent, so I assumed it to be unity." Needless to say, his nice report found a final resting place in the circular file alongside my desk.

There are many other things that tempt the boss to put down your report before he has read it. They are well known to you: long and involved sentences, lack of clarity, special terms he doesn't understand, in fact anything that makes for difficult reading. They can all be avoided by simply following the Golden Rule. *Put yourself in his place.* What kind of a report would you like to receive if you were in his place and had to make his decisions?

If I were to go on and on, as I should like to, I would be violating all of my own precepts. But one more word I would like to add. Be honest in your writing, honest with yourself, honest with your reader whoever he may be. A report that smacks of insincerity, or bias, or wire-pulling is doomed in advance to failure to accomplish its mission. Give your writing a chance to find its mark.

(From a speech before the University of Pennsylvania Conference on Scientific and Technical Writing)

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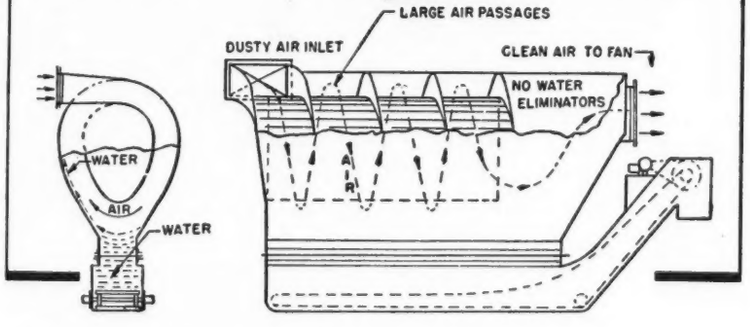

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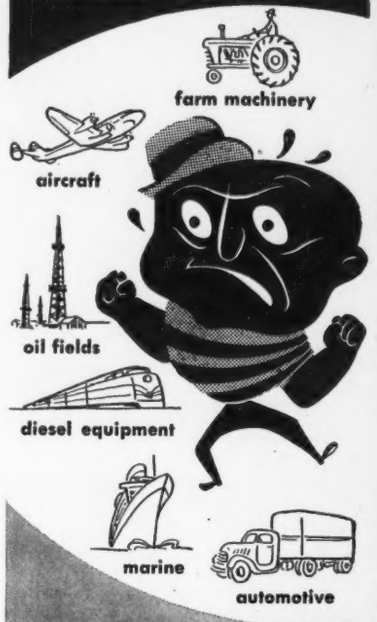

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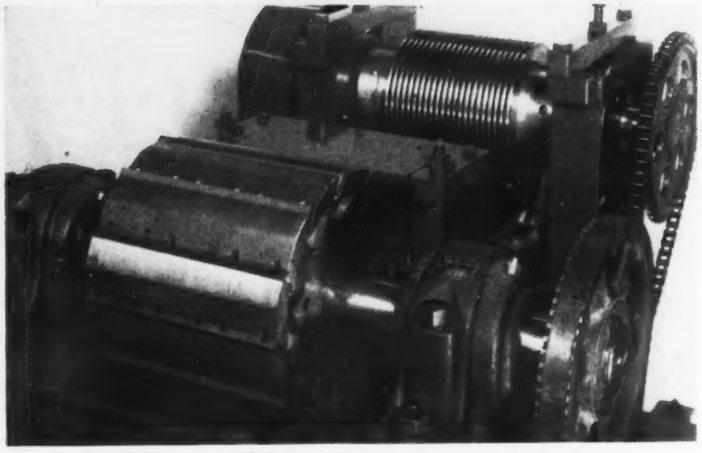

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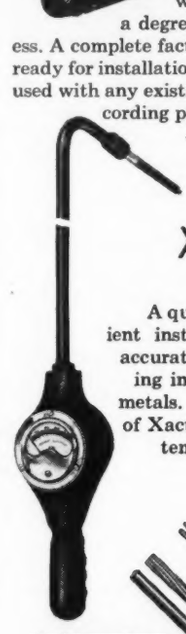

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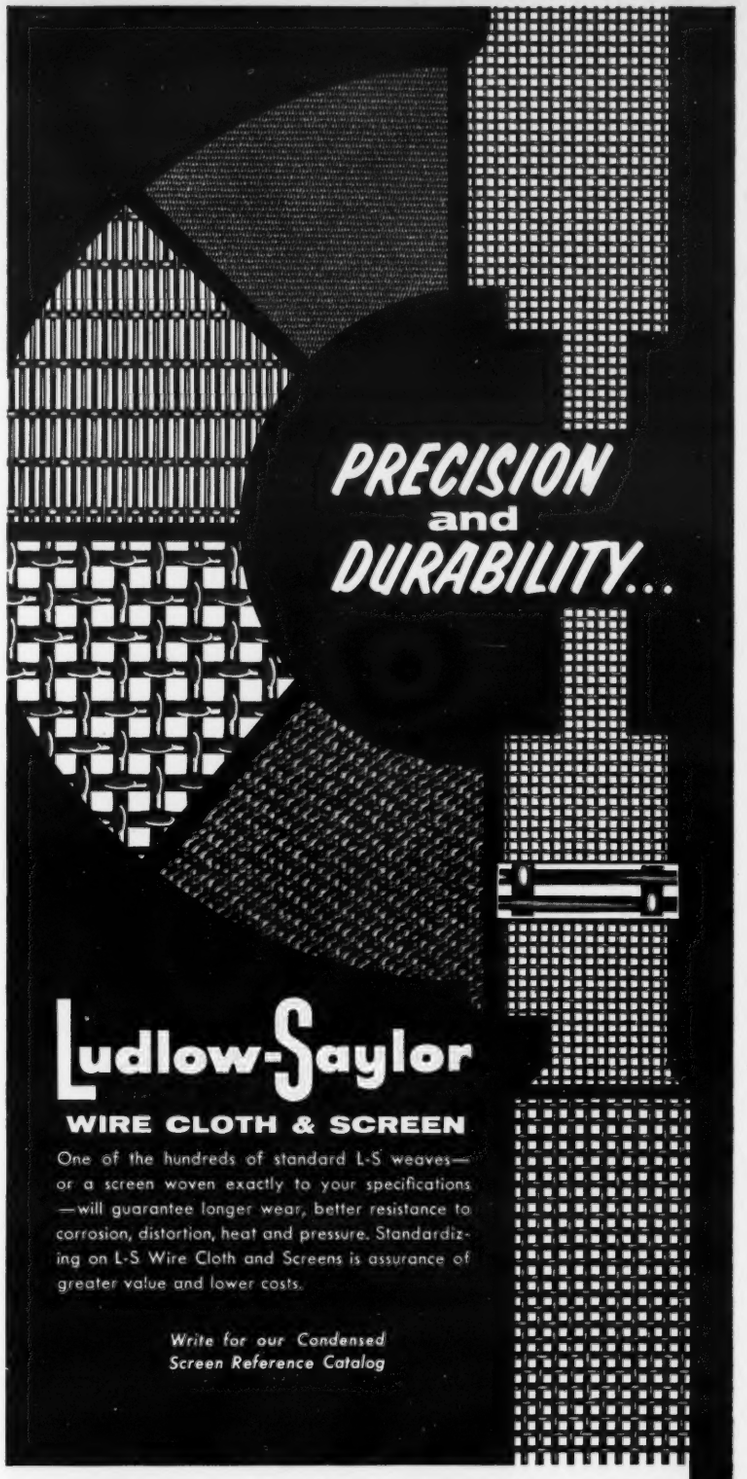
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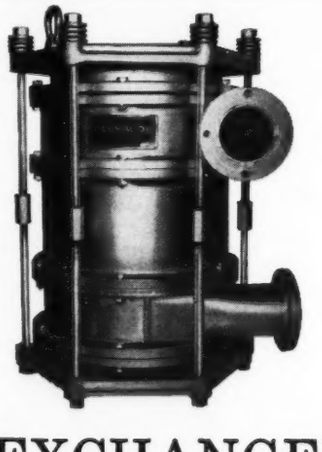

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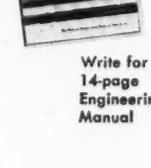
GRAPHITE HEAT EXCHANGER



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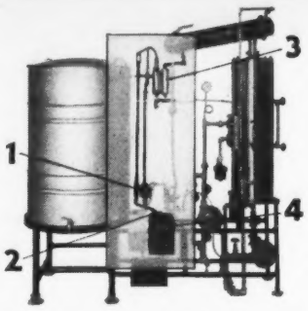

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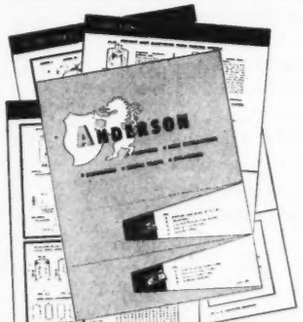

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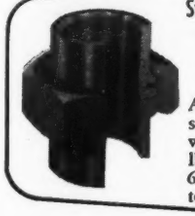

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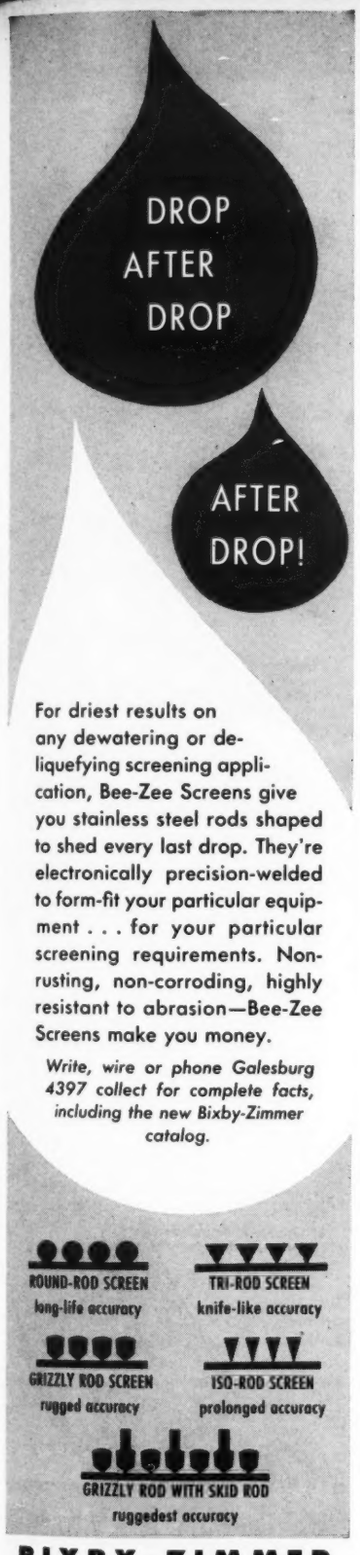

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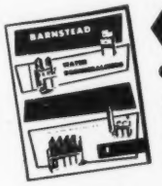

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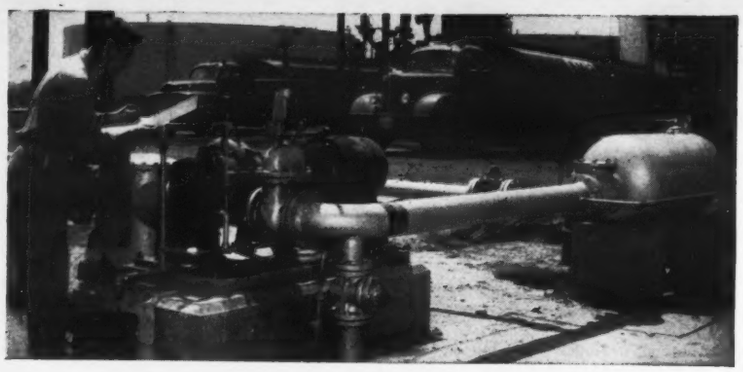
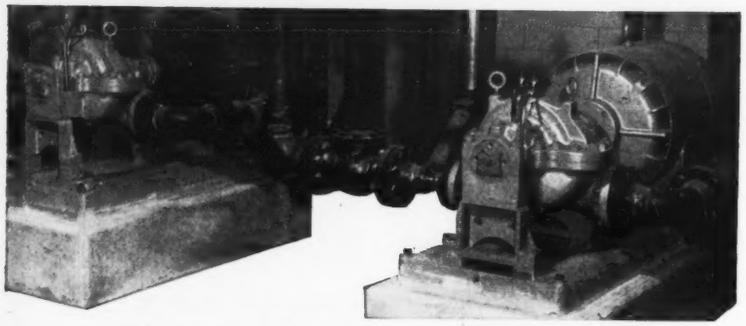


They needed pumping capacity



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2. Renewable stuffing box bushings.
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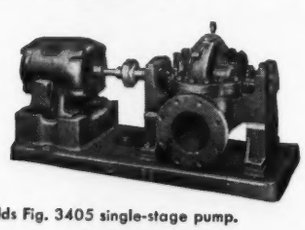
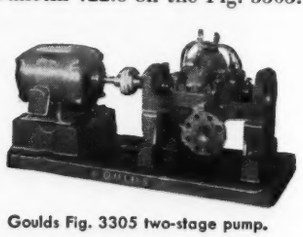
For further information write for Bulletin 721.6 on the Fig. 3405; Bulletin 722.6 on the Fig. 3305.



Goulds Fig. 3405 single-stage pump.



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- Big Capacity—up to 40 sq. ft. of screen area in floor space 3½ ft. square.
- Complete Rotary Motion—rapid, accurate separations.
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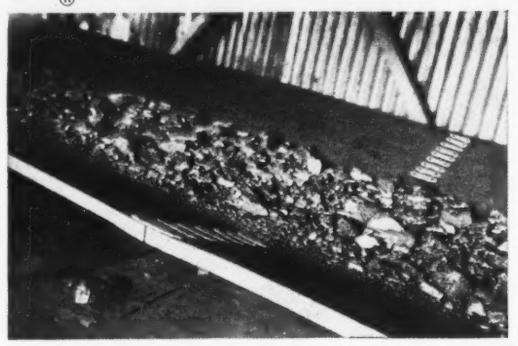

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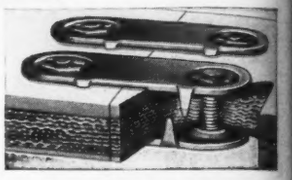

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THAT'S INTERESTING

(Continued from page 2)

"Step right up folks. It glistens, it glimmers, it shimmers."

Shimmering sheets of aluminum

By inducing formation of abnormally large grains in a special aluminum alloy and then making them stand out in relief by an acid etch, Alcoa has produced an aluminum sheet or extruded shape that shimmers. "Spangle-Sheet" has tiny mirror-like highlights surrounded by islands of shimmering silver and contrasting patches of light and dark gray.

While still in experimental stage, process development is being pushed. Color anodized finishes can also be processed into spangle-sheet.

This chewing gum doesn't stick

Stickless chewing gum is the subject of US patent 2,761,782. Gum's low adhesion is achieved by adding varying amounts of dimethyl polysiloxanes to existing formulas. (*D&O News*)

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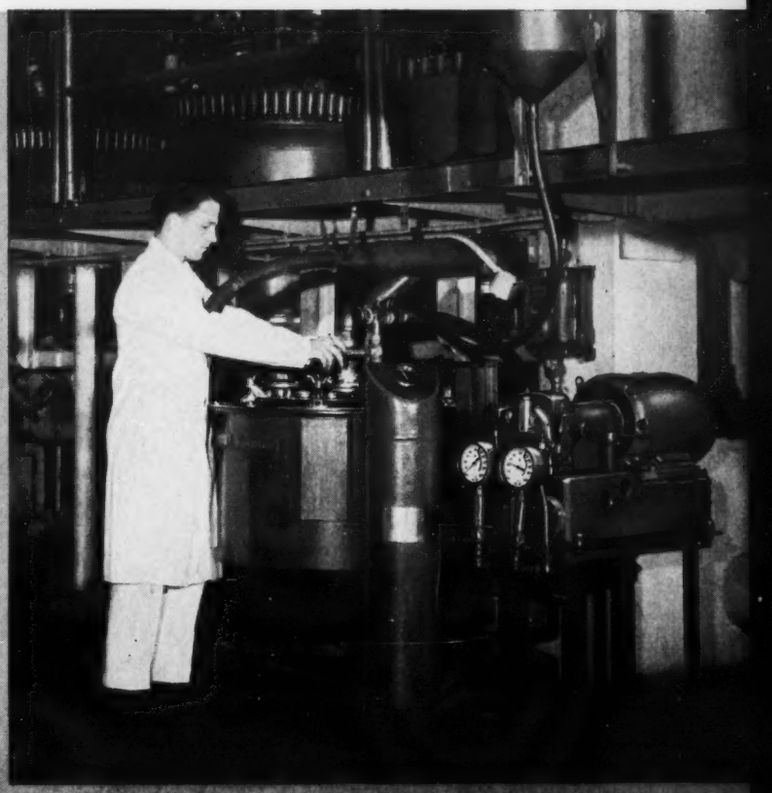
A new absorbable sponge not only has general characteristics of a conventional sponge but can be absorbed and readily assimilated by living animal bodies.

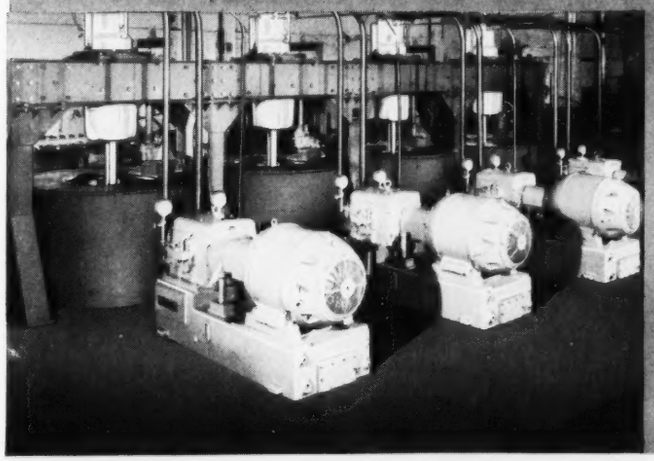
Dextran is basic material of the sponge, which was developed by Commonwealth Engineering Co. It can be sterilized without undergoing damage, cut into convenient swabs or packs, and deliberately left within an incision during surgery in order to keep a constant supply of therapeutic agent at a given point or to preclude hemorrhage.

Any speed for you too!

Unique Oilgear Fluid Power "ANY-SPEED" Drives establish new production and economy records

Any desired speed from zero to maximum . . . any rate of acceleration . . . any rate of deceleration . . . any rate of hydrodynamic braking . . . any speed adjustment between operations . . . synchronization of two or more drives . . . direct or remote precision speed control irrespective of load, input power or oil viscosity changes . . . all with Oilgear Fluid Power "Any-Speed" Drives. Old and new users name them *"the drives"* for their heavy-duty needs. You probably didn't know this! Every day, people are equally surprised—*and far more amazed when they know the facts.* Write and get them *now*. THE OILGEAR COMPANY, 1588 W. Pierce Street, Milwaukee 4, Wisconsin.





This Centrifuge at Abbott Laboratories

Leading house in pharmaceutical, drug and chemical field, Abbott Laboratories installed first Oilgear Drive on Tolhurst centrifuge in production department. Experience was so satisfactory it led to the inclusion of another Oilgear equipped Tolhurst centrifuge in their experimental laboratories.

SPECIFICATIONS: Speed continuously variable from zero to 1200 rpm max. (in this case). Full control of acceleration/deceleration speed and rate. Permits that infinitely modifiable speed best suited to loading, washing, spinning and unloading.

Photo Courtesy, Chemical Processing Magazine

This Centrifuge at powder plant in east

In a somewhat different application, these 4 Oilgear 60 hp "Any-Speed" Drives serve Tolhurst centrifuges in powder plant in the east. Centrifuge accelerates to 300 rpm for loading, to 900 rpm for 15-minute centrifuging, then decelerates to 70 rpm for "plowing." Unloading is automatic.

Tolhurst is a division of American Machine & Metals, Inc.

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Fluid Power

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